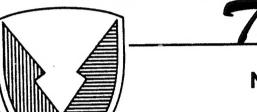
2419



CENTER



Technical Report

No. 13236

ELECTRIC DRIVE STUDY
VOLUME 2 OF 2

CONTRACT NUMBER DAAE07-84-C-R017

DEC 1987

20010920 137

Waldo E. Rodler, Jr. & Kenneth W. Shafer FMC Corporation, Ground Systems Division P.O. Box 58123 Santa Clara, CA 95052 FMC Report # 4668

By

APPROVED FOR PUBLIC RELEASE

REPRODUCED FROM
BEST AVAILABLE COPY

DISTRIBUTION IS UNLIMITED

U.S. ARMY TANK-AUTOMOTIVE COMMAND RESEARCH, DEVELOPMENT & ENGINEERING CENTER Warren, Michigan 48397-5000

NOTICES

This report is not to be construed as an official Department of the Army position.

Mention of any trade names or manufacturers in this report shall not be construed as an official endorsement or approval of such products or companies by the U.S. Government.

Destroy this report when it is no longer needed. Do not return it to the originator.

APPENDIX A

TECHNOLOGY SURVEY SUMMARY

Appendix A Technology Survey Summary

A.1 Technology Report

As required by contract DAAEO7-84-C-RO17, a comprehensive technology survey report was prepared between February and August 1984. This report details the approach and results of a survey of motors, solid-state controls, alternator/generators, and servo components which were potential candidates for the advanced electric drive study. In addition, solid-state components and various materials such as advanced magnetics were included in the survey. The survey report was approved in January 1985.

A.2 Survey Update

The motor tree at Figure A.2-1 formed the basis for the motor Results of the survey effort for motor selection is shown in Figure A.2-2. This selection process was the result of an extensive matrix/tradeoff analysis and was initially used in early concept development. As the concepts were refined, performance vehicle factors became an influence in the motor component selection. The result of the influence was the selection of the Homopolar motor for the DC system and the high frequency induction motor for the AC system. The selection of these motors for the Configuration I analysis dictated the such as the system components motor conditioners/controllers and the alternator/generators.

Figure A.2-3 compares the selected motors with respect to operational and characteristic attributes. The hybrid permanent magnet (PM) "brushless" motor is included in the comparison to indicate the effect of relative complexity introduced by the total PM motor/power conditioner system. In this comparison, the DC and AC motors operate independent of an external power conditioner.

It is apparent for this update comparison that no clear "best" motor component selection is possible since each different type has certain advantages not shared by the other.

Motor power controllers/conditioners are compared in Figure A.2-4. In this comparison, the DC system appears to have some advantage due to the inherent gain of the DC motor and thus the lack of any power semiconductors. The power controllers/conditioners for the AC and hybrid motors are all DC to AC inverter systems and are designed around large power semiconductors.

A comparison of selected alternator and generator technologies is shown in figure A.2-5. In this comparison, the AC alternator candidate is a standard aircraft design with an operating frequency of 400 Hz.

The present status of candidate power semiconductors is shown in Figure A.2-6. As expected, the semiconductor industry continues

to work on improvements to increase the voltage and current capability and reduce the turn-on/turn-off time. No significant technology break-through's are presently foreseen in this area which would produce a radical improvement for use in high power drive systems.

It is unfortunate that the majority of high power semiconductor research is being done outside the United States.

Figure A.2-7 documents the trend in magnetic materials used in permanent magnet motors. With the introduction of Neodymium/Iron/Boron, an alternative is not available to replace, Smarium-Cobalt magnets for high energy density applications. Neodymium/Iron/Boron will continue to be improved and should be seen in products within the next 3 to 5 years. The use of this new material should yield a significant weight reduction and associated cost reduction in motors and generators.

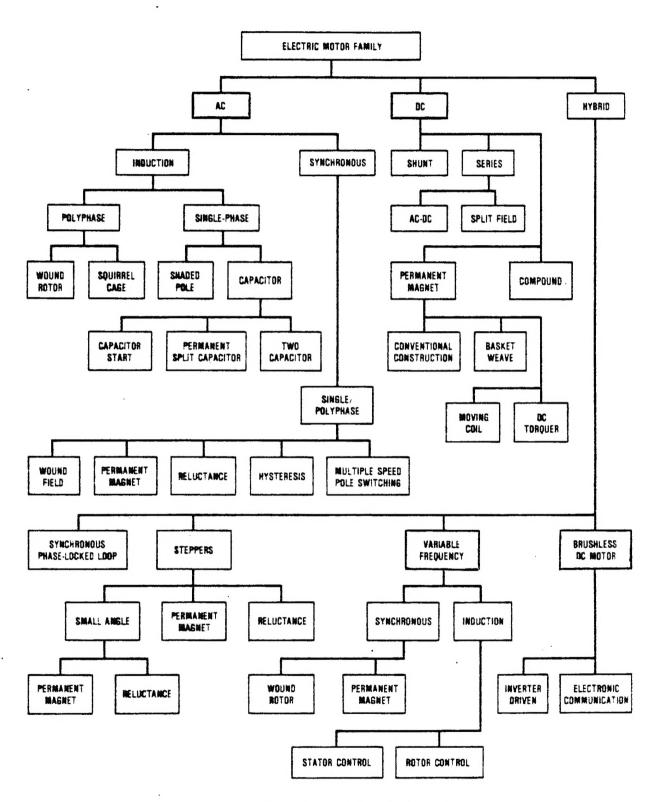


Figure A.2-1 Electric Motor Technology Tree

Motor Technology Screen

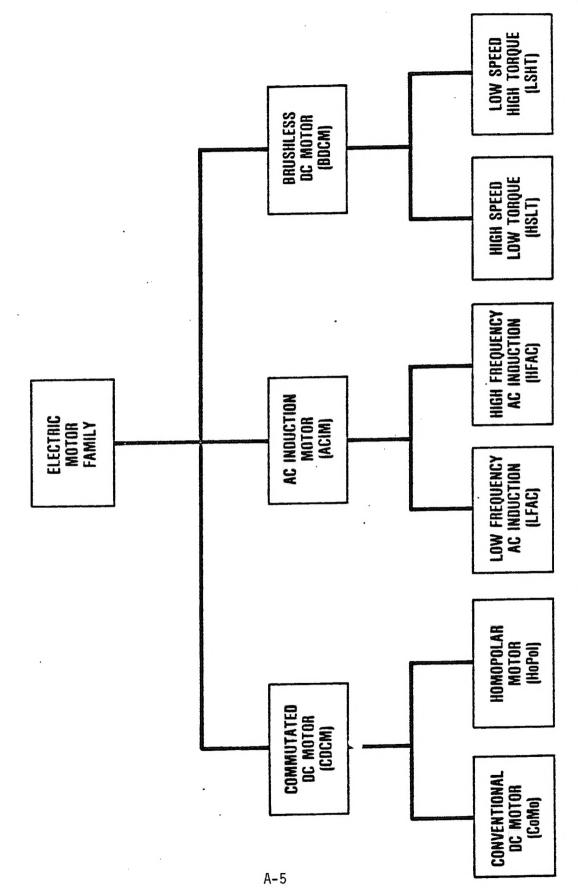


Figure A.2-2 Initial Motor Candidates

FI FCTRICAL SYSTEM COMPONENTS

45IMIG

| Ę |
|----------|
| COMPONE |
| 5 |
| |
| SYSIEM |
| 2 |
| 5 |
| |
| KICAL |
| \equiv |
| ج |
| FLE F |
| LLL |

- MOTORS -

| ATTRIBUTES | DC CHOMOPOLAR) | AC (INDUCTION) | HYBRID (PERM, MAG.) |
|------------------|------------------------|-------------------|------------------------|
| PEAK EFFICIENCY | 92,8% | . %26 | 35% |
| SYSTEM VOLTAGE | 18-32 | 200-600 | 009-00h |
| MAJOR LOSSES | BRUSH 1 ² R | ROTOR 12R | STATOR 12R |
| OVERLOAD RANGE | 14,37/1 | 14/1 | 6,4/1 |
| PEAK TORQUE | >1000 LB FT | > 1000 LB FT | MAGNET LIMIT |
| SPEED RANGE | 0-15,000 | 0-15,000 | 0-15,000 |
| P- ROTOR INERTIA | МОЛ | MODERATE | MODERATE |
| PACKAGING | 0009 | 0009 | 0009 |
| THERMAL CONTROL | FL00D C00L | FL00D C00L | FLOOD COOL |
| SHOCK/VIBRATION | 0009 | 0009 | MODERATE |
| RELIABILITY | 0009 | EXCELLENT | MODERATE |
| TECHNICAL RISK | MODERATE | МОЛ | HIGH |
| RELATIVE COST | 1.0 | 1.0 | 2.0 |
| | | | |

Figure A.2-3 Selected Motor Candidates

45IMIG

ELECTRICAL SYSTEM COMPONENTS

- MOTOR CONTROLLERS -

| ATTRIBUTES | DC (HOMOPOLAR) | AC (INDUCTION) | HYBRID (PERM, MAG,) |
|----------------------|-------------------|----------------|------------------------|
| EFFICIENCY | > 95% | > 95% | ≯ 85% |
| CONTROL MODE | VF-PWM | VFAC | VF-PWM |
| CONTROL RANGE | 100% | 100% | 286 |
| CONTROL POWER RATIO | 2,7% | 100% | 100% |
| COMPLEXITY | FOW | MODERATE | нен |
| RELIABILITY | 0009 | MODERATE | MODERATE |
| POWER SENICONDUCTORS | NONE | 6/3 PHASE | 6/3 PHASE |
| SEMICONDUCTOR LOSSES | MO7 | MODERATE | MODERATE |
| REGENERATIVE | YES | YES | YES |
| EMI/RFI | ПОМ | MODERATE | HIGH |
| | | | |

Figure A.2-4 Selected Motor Controllers

ELECTRICAL SYSTEM COMPONENTS

- ALTERNATORS/GENERATORS -

| CHARACTERISTICS | AC ALTERNATOR (400HZ) | DC GENERATOR (HOPOL) |
|--------------------|-----------------------|----------------------|
| EFFICIENCY | HIGH - >93% | #IGH - >93% |
| OPERATING SPEED | 8000-12000 RPM | 10000-14000 RPM |
| VOLTAGE CONVERSION | RECTIFIER | DIRECT |
| FIELD CONTROL | YES | YES |
| REGULATION | 0009 | 0009 |
| THERMAL CONTROL | SPRAY 01L | FL00D C00L . |
| REGENERATION | INVERTER/RECTIFIER | BI-DIRECTIONAL |
| POWER/WEIGHT RATIO | EXCELLENT | 0009 |
| POWER/VOLUME RATIO | 0005 | 0009 |
| | | |

ELECTRICAL SYSTEM COMPONENTS

- SEMICONDUCTORS -

PRESENT STATUS

* FOCUS ON HIGH VOLTAGE/HIGH CURRENT - UTILITY APPLICATIONS SILICON CONTROLLED RECTIFIER (SCR) - INTEGRATED TRANSISTOR GATE

GATE CONTROLLED RECTIFIER (GTO) - INTEGRATED TRANSISTOR GATE * FOCUS ON IMPROVEMENT IN TURN ON/TURN OFF GAIN BIPOLAR JUNCTION TRANSISTOR (BJT) - INTEGRATED TRANSISTOR BASE

* FOCUS ON IMPROVING GAIN AT HIGH CURRENTS/HIGH VOLTAGE

* FOCUS ON REDUCING OHMIC LOSS AND POWER DISSIPATION FIELD EFFECT TRANSISTOR (FET) - MATERIALS IMPROVEMENT

PRESENT TREND

MAJOR EMPIIASIS IN POWER SEMICONDUCTORS CONTINUES TO BE IN JAPAN, INTRODUCED 1500 VOLT/350 AMP DEVICE.

Figure A.2-6 Power Semiconductors Status

ELECTRICAL SYSTEM COMPONENTS

- MAGNETIC MATERIALS -

| IMPACT | 10-30% REDUCTION | PRESENT PRODUCTS | NEW |
|----------------|-------------------------|-----------------------|-----------------------|
| ENERGY PRODUCT | 16-18 x 10 ⁶ | $28-32 \times 10^{6}$ | $45-60 \times 10^{6}$ |
| YEAR | 1970 | 1978 | 1984 |
| MATERIAL | SMARIUM COBALT 5 | SMARIUM COBALT 217 | NEODYM1UM-IRON-BORON |

REND

PREDUCT 3-5 YEARS FOR NEODYMIUM-IRON TO BE PROMINENT IN MARKET. SHOWS GOOD PROMISE OF REDUCING COST AND USE OF CRITICAL MATERIALS. MAJOR PROBLEM WILL BE PROPER THERMAL CONTROL

Figure A.2-7 Magnetic Material Trends

APPENDIX B

DATA GENERATION REPORTS

B.l Analytical Methods Used For Performance Analysis

Our performance analysis used validated computer programs to evaluate all significant factors when preparing performance predictions. Existing programs were adapted to meet the specific analysis requirements of this project. These existing programs were based on the principles of SAE recommended practice J688, with appropriate modifications for tracked vehicles. The resulting programs produced the following specified data:

- 1. Tractive effort vs. speed
- 2. Acceleration
- 3. Startability on grades
- 4. Maximum speed on grades
- 5. Minimum turn radius vs. speed

The programs were integrated on a conservation of energy basis:

[1] (Input HP - Loss HF) * (Drive efficiency) = Fower output

The input horsepower is the engine horsepower at its operating speed less the appropriate deductions for altitude, temperature, air cleaner, muffler and grills. The loss horsepower includes such items as cooling fan, auxiliary generator, hydraulic pumps and similar parasitic loads. The drive efficiency is measured from engine flywheel to sprocket to fairly assess added losses due to speed up transfer cases to drive high speed generators or high ratio final drives to match high speed motors. The power output to rolling resistance, windage (air resistance), grade resistance and turning losses.

The power budget for the input horsepower is as follows:

| | Net inout horsenower | AGE O |
|----|-------------------------|-------|
| 3. | Air cleaner & muffler | - 5.0 |
| 2. | Conditions (standard) | - 0.0 |
| .L | Rated engine horsepower | 500.0 |

The power budget for parasitic losses is as follows:

| 1. | Net input horsepower | 495.0 |
|----|----------------------------------|--------|
| 2. | Fan (sized for ballistic grills) | -46.2 |
| 3. | Auxiliary generator · · | - J, S |
| 4. | Hydraulic pump | - 3.0 |
| | Net input horsepower | 440.0 |

The drive efficiency is determined as follows:

- 1. Generator (or alternator) efficiency is estimated from data for similar items and from manufacturer's estimates. Since these efficiencies are essentially constant at loads over 25% of rating, and the analysis is for full power, a fixed efficiency value is used for all calculations for any given generator type.
- 2. Power conditioning and control equipment, like the generator, have essentially constant efficiency under normal loads and are therefore also held at a fixed value that is based on data for similar items and on manufacturer's estimates.
- 3. Motor efficiencies under normal loads are primarily a function of armature speed (RPM). Curve fits have been made with correlation coefficients of at least 0.99 and the resulting equations are used to calculate the efficiency of each motor at each operating point of every operating condition. This detailed approach becomes particularly significant in turns, when each motor has its own individual efficiency at each operating point. Refer to Section 5.1.4.6, Figure 5.1.4.6-B for an example of the differentiations between systems that result from this precise analysis.
- 4. Power output must equal the sum rolling resistance, wind resistance, grade resistance and turn losses so steady state operation can exist. These values are determined as follows:
 - o Rolling resistance:

Rolling resistance has been based on a value of 100 pounds per ton, which has been found to be a reasonable value for tracked vehicles on smooth, hard surfaces.

[2] RR = GVW / 2000 * Cr

Where:

RR = Rolling resistance in pounds
GVW = Gross veicle weight
Cr = Rolling resistance coefficient
(100 pounds per ton for this study)

o Wind resistance:

Wind resistance has been based on the specified frontal area, a drag coefficient (Cd) of 1.0, vehicle speed in MFH, and a coefficient of 1/391 for standard conditions (ref. Fluid Dynamic Drag, Dr.-Ing. Sighard Hoerner).

These values are used as follows:

[3] $Rw = Af * Cd * (MPH ^ 2) / 391$

Where:

Af = Frontal area in square feet Cd = Drag coefficient (estimated at 1.0) MPH = Vehicle speed, miles per hour

o Grade resistance:

Grade resistance is calculated from the basic geometric considerations. The equation used is:

[4] Rg = GVW * Sin (Atn (GR / 100))

Where:

Rg = Grade resistance in pounds GVW = Gross vehicle weight in pounds GR = Grade in per cent

o Turning losses:

Turning losses consist of power dissipated in scrubbing the tracks around a turn and regeneration losses due to inefficiencies in the regeneration system. These values of scrub horsepower and regenerative horsepower are quantified using methods originated by Merritt and updated in TACOM Technical Report 10969, "Investigation of the Factors Involved in Steering Tracklaying Vehicles". As the method is complex, reference to this report is recommended for those who want the details of the analytical method. The "Scrub Horsepower" is applied directly as a loss. The regeneration loss is found by first determining regeneration efficiency from motor speed and controller efficiency, as is described for drive efficiency. The Transfer Horsepower is then multiplied by the regeneration efficiency to determine the losses due to regeneration.

The above analytical methods have been integrated into a series of programs to solve for specific operating conditions such as tractive effort vs. speed, speed vs. time, speed vs. distance, maximum speed vs. grade, and minimum turning radius vs. speed. In each case the complexity of the calculation necessitates an iterative solution. The appropriate variable is increased until a power balance is reached and the requirements of equation [1] above are met. The performance and load values for that

particular operating point are then printed as required by the contract.

B.2 Data Table Description

The tables in Appendix B provide detailed quantification of the results discussed in the report and the power train load and speed data required by the contract. The following tables tabulate the performance analysis data used in this report. Tables are organized to facilitate comparative analysis by grouping by type of performance, and presenting data for all of the various vehicle and drive types within that group. The data table groups are:

- A. Speed vs. grade and tractive effort
- B. Acceleration
- C. Sprocket and motor speeds and loads for maximum turn condition
- D. Gear speeds and loads at maximum turn condition
- E. Gear speeds and loads at maximum tractive effort condition

Within these groups are performance results for the following vehicle and drive types:

- 1. 19.5 ton, Configuration I, AC induction motor drive system
- 2. 19.5 ton, Configuration II. AC induction motor system
- 19.5 ton, Configuration I, DC homopolar system
- 4. 40 ton, Configuration I, AC induction motor drive system
- 5. 40 ton, Configuration II, AC induction motor drive system
- 6. 40 ton, Configuration I, DC homopolar system

Tables can be easily located by combining the heading letters and numbers from the above listings. As an example, acceleration data for the 19.5 ton, Configuration II, AC induction system is in table B-2.

B.2.A Speed Vs Grade And Tractive Effort Tables

The following tables provide speed vs. grade data plus corresponding sprocket speeds and torques. They are divided into three sections consisting of Title Heading, Data Input and Results. The Title Heading provides in addition to the title, traceability data of program authors, revision data and run date.

The data input section inputs • general vehicle description parameters plus operational assumptions such as:

- 1. Maximum speed: A value of 45 MPH has been used as a contract requirement.
- Drag coefficient: A value of 1.0 has been used as a reasonable, yet conservative value throughout this study.
- 3. Rolling resistance: A value of 100 pounds per ton has been used to represent operation on a smooth, hard surface.
- 4. Engine gross horsepower: Values of 500 and 1000 have been used for the 19.5 and 40 ton vehicles respectively as directed by the contract.
- 5. Engine loss horsepower: Values of 60 and 120 have been used for the 19.5 and 40 ton Vehicles respectively. See Section A.II.1 for a sample loss budget.

The results section of these tables provide the following data:

- 1. Grade (%): Increments have been selected to provide the range of data specified in the contract.
- Speed (MPH): This is the maximum speed the vehicle can maintain on the specified grade.
- 3. Resistance (Pounds): This is the resistance encountered when operating at the stated speed on the stated grade and equals the tractive effort at this limiting condition.
- 4. Sprocket Torque and RPM: These data can be used to calculate torques and speeds required in related drivetrain components.

(FOR ELECTRICAL DRIVE TRACKED VEHICLES)

BV: W.E. RODLER

L.M. FERNANDEZ

REV. DATE: 11 JUNE 1984

DATA INPUT:

RUN DATE: 7-AUG-85111

HAX. VEL., mph = 45.0 ENG. GROSS HP. = 500.0 EROMIAL AREA, sq. ft. = 57.0 ENG. LOSS HP. = 60.0 GROSS VEHICLE WI., lbs = 39000.0 TRACK PITCH, in = 6.03 DRAG COEFFICIENT = 1.00 ND. OF SPROCKET TEETH = 11 RULLING RESISTANCE, lb por ton = 100.0

SPROCKET(1bft) 9681.58 8529.35 7229.22 5792.50 4231.75 3418.64 2596.11 1780.58 1623.21 1319.10 1254.27 1468.80 RESISTANCE(1b) SPROCKET(rpm) 151-64 85.45 98.14 117.89 2111.97 265.63 351.28 511.50 560.86 611.29 683-26 716.42 22019.54 19396-87 16442.23 13169.79 1175.86 3338.64 9624.37 5901.62 1048.05 3689.68 2998.36 2853.53 SPEED(mph) 45.00 5.37 6.16 7.40 9.52 13.31 35.23 38.77 16.68 22.06 32.13 42.92 GRADECT) \$0.00 15.00 90-09 40.00 30.00 20.00 10.00 5.00 4.00 3.00 2.00 1.56

End

B-8

| | (CES) |
|-----------|------------|
| NCE | VEHICLES |
| PERFORMAN | TRACKED |
| GRADE | DRIVE |
| LIMITING | ELECTRICAL |
| | (FOR |

| | | | | 500.0 60.0 = 6.03 TEETH = 11 | :sosessosesosesos II: PROPULSION/ IOTORS | SPROCKETCIbft) | 9669.09 | 8528.54 | 7228-49 | 5791.69 | 4231.07 | 3419.66 | 2594.78 | 1117.94 | 1620-11 |
|---|--------------------------------|-----------------------|---------|---|---|----------------|----------|----------|----------|----------|---------|---------|---------|---------|---------|
| PERFORMANCE TRACKED VEHICLES) | TE: 11 JUNE 1984 | 12 | | ENG. GRDSS HP. ** ENG. LOSS HP. ** TRACK PITCH, in ** NO. OF SPROCKET 1 | ###################################### | SPROCKET(rpm) | 83.60 | 95.86 | 115.10 | 147.95 | 207.27 | 259.54 | 344.00 | 501.40 | 550.02 |
| LIMITING GRADE PERFORMANCE ELECTRICAL DRIVE TRACKED VE | RODLER REV.DATE: FERNANDEZ | RUN DATE: 7-AUG-85:12 | | 57.6 = 39000.0 er ton = 100.0 | seksekskekskekskekskekskekskekskekskeks | RESISTANCE(1b) | 22019.36 | 19396.62 | 16441.86 | 13169.16 | 9623.24 | 1114.02 | 5898.71 | 4042-16 | 3682.75 |
| LIMI CFOR ELECT | 87: W.E. RODLER L.M. FERNAN | RUN | INPUT: | MAX. VEL., mph = 45.0 FRONTAL AREA, sq. ft. = 5 GROSS VEHICLE WI., 1bs = 3 ORAG COEFFICIENT = 1.00 ROLLING RESISTANCE, 1b per | ###################################### | SPEED(mph) | 5.25 | 6.02 | 7.23 | 9.29 | 13.02 | 16.30 | 21.61 | 31.49 | 34.55 |
| | 8 | | DATA IN | MAX. VEL., mph = FRONTAL AREA, sq. GROSS VEHICLE WT DRAG COEFFICIENT ROLLING RESISTAN | estotestestestes Efficiency data by Craig J settestestestestestestestestestestestest | GRADECED | 00.09 | 50.00 | 40.00 | 30.00 | 20.00 | 15.00 | 10.00 | 5.00 | 00-+ |

εθες το βεγτος το προτος το προτος το προτος το προτος που προτος που προτος που προτος που προτος που προτος Επαί

1227.59 1315.08

716.42

2791-15

45.00

1.40

2989.18

42.18

1620.11 1465.43

550.02 91.909 671.48

3330.80

38.07

3.00 2.00

| ssstoranstatatestatatatatatatatatatatatatatatata | |
|--|--|
|--|--|

8Y: W.E. RODLER REV.DATE: 11 JUNE 1984 L.M. FERNANDEZ

RUN DATE: 7-AUG-85:10

| MAX. VEL. 9 mph = 45.0 FRONTAL AREA, 84. ft. = 57.0 | ENG. GROSS HP. = 500.0 |
|---|--|
| GROSS VEHICLE WI., 16s = 39000.0 Drag coefficient = 1.00 | TRACK PITCH, in = 6.03 NO. OF SPROCKET TEETH = 11 |
| ROLLING RESISTANCE, 1b per ton = 100.0 | |

| restessousousossuusestatestatestatestatestatestatestat | 新国军员建设设施的建设设施设备的基础设施的设施的设计和保护公司的设计设计设计设计设计设计设计设计设计设计设计设计设计设计设计设计设计设计设计 | | | |
|--|--|----------------|---------------|----------------|
| GRADECES | SPEED(mph) | RESISTANCE(16) | SPROCKET(rpm) | SPRUCKETCIBFE) |
| 00.09 | 5.07 | 22019.08 | 80.70 | 9669.14 |
| 20.00 | 5.82 | 19396.27 | 92.69 | 8529.64 |
| 40.00 | 1.01 | 16441.40 | 111.61 | 7229.25 |
| 30.00 | 9.05 | 13168-51 | 144.08 | 5790.40 |
| 20-00 | 12.65 | 9621.84 | 201.32 | 4231.09 |
| 15.00 | 18.81 | 1111.11 | 251.68 | 3417.52 |
| 10.00 | 20.91 | 5894.39 | 332.90 | 2592.41 |
| 2.00 | 30.25 | 66"0609 | 481.64 | 1173.07 |
| 00-+ | 33.01 | 3667.61 | 525-54 | 1613.12 |
| 3.00 | 36.16 | 3310.09 | 575.68 | 1456.34 |
| 2.00 | 39.79 | 2960-62 | 633.43 | 1302.65 |
| 1.00 | 43.90 | 2620.96 | 698.95 | 1153.27 |
| 91.0 | 45.00 | 2541.60 | 716.42 | 1118.05 |

| * | |
|----|-----|
| * | |
| 8 | |
| # | |
| 4 | |
| 4 | |
| * | |
| ** | |
| * | |
| ä | |
| 46 | |
| # | |
| 4 | |
| # | |
| * | |
| 22 | |
| 7 | |
| - | |
| 4 | |
| - | |
| 41 | |
| 4 | |
| * | |
| ** | |
| X | |
| * | - 5 |
| 8 | - 3 |
| # | - |
| 4 | 3 |
| 4 | - |
| 44 | - 5 |
| * | - 4 |
| = | |
| 2 | |
| - | • |
| * | 4 |
| # | - |
| * | |
| # | ٥ |
| * | - |
| * | |
| * | - 5 |
| * | 1 3 |
| # | - 1 |
| ä | |
| | - 3 |
| 45 | - |
| * | - |
| 42 | |
| * | |
| * | |
| × | |
| 8 | |
| 8 | |
| 44 | |
| # | |
| 4 | |
| * | |
| * | |
| * | |
| * | |
| - | |
| 45 | |
| | |
| 4 | |
| 4 | |
| * | |
| 7 | |
| - | |
| | |
| - | |
| # | |

LIMITING GRADE PERFORMANCE (FOR ELECTRICAL DRIVE TRACKED VEHICLES)

SPROCKET(16ft) 22119.23 18745.93 25114.27 15016.77 10963.23 8846.72 6695.79 4545.70 4123.02 3706.03 3297.71 3172.08 SPROCKET(rpm) 204.99 65.74 75.50 99.06 400-73 441.62 489.24 546-25 566.56 163.44 272.41 116.54 RESISTANCE(1b) 27007. 8171.84 6662-50 45164.42 39783.36 33720.31 19718.71 15913.51 12042-02 7412.21 5928.26 SPEED(mph) 9.26 5.22 6.00 7.20 12.98 16.28 21.64 31.83 35.08 38.86 43.39 45.00 GRADECK) 1.69 60.00 50.00 40.00 30.00 20.00 3.00 2.00 15.00 10.00 5.00 4.00

| 安徽在李宗帝中的中央中央中央中央中央中央中央中央中央中央中央中央中央中央中央中央中央中央中 | LIMITING GRADE PERFORMANCE (FUR ELECTRICAL DRIVE TRACKED VEHICLES) |
|---|---|
|---|---|

BY: W.E. RODLER REV.DATE: 11 JUNE 1984

RUN DATE: 12-AUG-85:107

| \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | ENG. GROSS HP. #1000.0 ENG. LOSS HP. #120.0 TRACK PITCH, in #7.63 NO. OF SPROCKET TEETH # 11 | |
|--|--|-----|
| 形型化聚化液化聚化液化聚化溶液化溶液化溶液化溶液化溶液化溶液化溶液 医医尿管 医医尿管 医医尿管 医医尿管 医医尿管 医乳蛋素 医乳蛋素 医乳蛋素 医乳蛋素 医乳蛋素 医乳蛋素 医乳蛋素 医乳蛋素 | • | |
| Potetaetaetaetaetaetaetaetaetaetaetaetaeta | MAX. VEL., mph = 45.0 FRONTAL AREA, 89. ft. = 68.3 GROSS VEHICLE WI., 1bs = 80000.0 DRAG COFFICIENT = 1.00 ROLLING RESISTANCE,1b per ton = 100 | *** |

| PULSI: | |
|--|---|
| RS PRC | |
| MOTO | |
| Efficiency data for Westinghouse induction motor # CONCEPT II: PROPULSION/ by Craig Joseph 10-MAY-85 # STEER MOTORS RESULTS: | |
| * # # | |
| no to | |
| Efficiency data for Mestinghouse induction motor \$ CON detateteteteten \$ 10 N | |
| Induc | |
| 858 858 844 844 844 844 844 844 844 844 | |
| AAAA | |
| H | |
| 40 to 5 | |
| B 4 4 | ! |
| CC CC SULTS | |
| icie b man | Í |
| *** | |

| | | | \ II. | つ サー・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ |
|-------|-------|-----------------------------------|--------|--|
| 00.00 | 5.11 | 45164.21 | 76 37 | |
| 20.00 | 5.86 | 39783.07 | 63.40 | 25091.81 |
| 00-09 | 7.03 | 33719.88 | 13.13 | 22117.27 |
| 30.00 | 9.03 | 27002-07 | 88.52 | 18744.21 |
| 20.00 | 12.69 | 19717-42 | 113.72 | 15014.99 |
| 15.00 | 15.91 | 15911.41 | 18.651 | 10962.05 |
| 10.00 | 21.18 | 12030 43 | 200-28 | 8850.32 |
| 5.00 | 31.18 | | 266.72 | 6693.72 |
| 4.00 | | * | 392.60 | 4541.53 |
| | 34.37 | 7403.70 | 432.78 | 4118.07 |
| 00.5 | 36.13 | 6652.67 | 480.03 | 3700-66 |
| 2.00 | 45.60 | 5916.42 | 536.32 | |
| 1.54 | 45.00 | 1.54 45.00 5585.32 566.56 3104.59 | 566.56 | 3104.59 |

| 8 | |
|----|-----|
| # | |
| 살 | |
| 8 | |
| 4 | |
| * | |
| ĕ | |
| 4 | |
| # | |
| 2 | |
| # | |
| # | |
| * | |
| # | |
| * | |
| * | |
| # | |
| * | |
| * | |
| ä | |
| # | w |
| * | 2 |
| * | = |
| # | Ī |
| * | ~ |
| 2 | 5 |
| # | ~ |
| 4 | * |
| 2 | • |
| ä | ш |
| * | 0 |
| 4 | 3 |
| # | 9 |
| 4 | _ |
| * | 5 |
| 8 | - 2 |
| 4 | - |
| * | = |
| 8 | 3 |
| # | - |
| * | |
| 2 | |
| 4 | |
| * | |
| 2 | |
| * | |
| * | |
| # | |
| | |
| # | |
| * | |
| * | |
| 4 | |
| * | |
| * | |
| * | |
| * | |
| # | |
| 44 | |
| | |

(FOR ELECTRICAL DRIVE TRACKED VEHICLES)

BY: W.E. RODLER

L.M. FERNANDE2

RUN DATE: 12-AUG-85:105

DATA INPUT:

MAX. VEL., mph = .45.0 FRONTAL AREA, sq. ft. = .68.3 GROSS VEHICLE WI., 1hs = 80000.0 DRAG COFFICIENT = 1.00 ROLLING RESISTANCE, 1b per ton = 100.0

SPROCKET(16ft) 8846.90 18746-69 15017.98 10963.23 4535.66 3689.80 22120.61 6690.93 4110.52 3275.36 2912.90 SPRUCKET(rpm) 71.47 86.03 111.06 155.69 195.18 461-41 259.60 380.85 512.70 \$66.56 617.98 RESISTANCE(1b) 39782.71 45163.93 33719.41 27001.42 19715.98 15909-19 12034.51 8154.74 7389-82 6633.36 5889-14 5241.41 SPEED(mph) 8.82 15.50 20.62 30.25 33.20 36.65 40.72 5.68 6.83 12.37 45.00 GRADE(%) 50.00 15.00 10.00 2.00 4-00 3.00 2.00 1.11 60.00 40.00 30.00 20.00

φες κεγετερός και προσφορά το προσφορά το προσφορά το προσφορό το προσφορό το προσφορό το προσφορό το προσφορ End

B-13

B.2.B Acceleration Tables

The following tables provide acceleration data consisting of time, tractive effort, speed, distance and sprocket RPM, torque and horsepower. These tables are divided into three sections consisting of the Title Heading, Data Input and Results. The Title Heading provides in addition to the subject, traceability data of program author, operator, purpose, revision date and rundate.

The Data Input section inputs general vehicle description parameters plus operational assumptions such as:

- Coefficient of drag: a value of 1.0 has been used as a reasonable, yet conservative value throughout this study. This coefficient is multiplied by the frontal area and the velocity head to provide air resistance.
- 2. Rolling resistance: a value of 100 pounds per ton has been used to represent operation on a smooth, hard surface. This value is multiplied by the gross vehicle weight in tons to obtain vehicle rolling resistance.
- 3. Coefficient of friction: a value of 0.7 has been used to represent the contact between the track and the roadway. This is used to limit the maximum possible acceleration to the value that the selected adhesive condition will allow.
- 4. Mass increment for rotation: This value has been calculated from the motor and gear train data. It is input as a fraction of the translational mass of the vehicle. In the calculations, the translational mass of the vehicle is increased by this amount to correct for the rotational inertia of the system.
- 5. Grade, %: This value is determined by the operating situation. Most calculations have used level (0%), but it was also used to confirm starting performance on a 60% grade.

The results section provides the following acceleration data:

- 1. Time (seconds): This is cumulative time from the start of the run. As directed by the contract, no allowance is made for throttle response time.
- Net tractive effort (pounds): This shows the tractive effort available at the corresponding time. It can be either power or adhesion limited.
- 3. Speed (MPH): This is the instantaneous speed at the given time.
- 4. Distance (feet): This is the cumulative distance from the start of the run.

5. Sprocket RPM, LB-FT, and HF: These data can be used to calculate speeds, torques and powers required in the related drive train components.

| BY: M.E. R.E. ******************************* | | REDLER LEWIS ************************************ | DPERATOR: R LEWIS PURPOSE: ELECTRIC SOURCE STATEMENT OF TRACK PITCH, Inc. COEFFICIENT OF COEFFIC | COEFICIENT OF CO | BY: W.E. RDDLER Raceletts Recent to the proposal purpose electric drive proposal purpose electric drive proposal purpose electric drive proposal electric drive proposal electric drive proposal electric drive proposal electric drive electric drive electric drive electric map = 39000. RECIPIO COEFFICIENT OF DRAG = 1.00 RACING RESISTANCE, 1D/ton = 100.0 FRONTAL AREA, in. = 57.0 Efficiency data for Mestinghouse induction motor #CONCEPT I: TWIN DRIVE MC by Craig Joseph 10-MAY-85 ### FESULTS: | REV. DATE: 31 MAY 1995 RUN DATE: 7-AUG-85:14 HASS INCR. FOR ROT: % GRADE, % = 0.0 SPROCKET (hp each) | 31 MAY 1985 7-AUG-85:14 \$000000000000000000000000000000000000 |
|--|---|--|--|--|--|---|---|
| ************************************** | | * 1bs = 39 h = 45.0 h = 45.0 EFTH = 11 57.0 Mestinghous h 10-May-85 casettenses | 1000 ROLLING TRACK P TRACK P TRACK P TRACK P TRACK P TRACK P | COEFFICIENT COEFFICIENT TICH, In. = 6 ICIENT OF FRIC NOTOR #CONCEPT #################################### | TOF DRAG = 1.00 1.03 TION = 0.70 TION = 0.70 TS TWIN DRIVE MC TS PROCKET (1b-ft each) | HASS INCR. FO GRADE, T. = TORS SPROCKET (hp each) | |
| 40 1 | TEHICLE WEIGHT I VELOCITY BE GROSS MP. # 4 OF SPROCKET T AREA in. # 7 OF SPROCKET T Y Craig Josephysteresteresteresteresteresteresterester | * 1bs = 39 40.0 40.0 6ETH = 11 57.0 Mestinghous h 10-HAY-85 connected | ODG. RELLING TRACK P COEFF1 COEFF2 COEFF2 COEFF2 COEFF3 CO | COEFFICIENT RESISTANCE, ITCH, In. = 6 ICIENT OF FRIC COLOR #CONCEPT # PRAFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF | OF DRAG = 1.00 1.00 = 1.00 .03 .TIDN = 0.70 I: TWIN DRIVE MG ************************************ | HASS INCR. FO GRADE, T. T. 11DRS H#################################### | R RDI. % =47.20 0.0 1.0.0.00000000000000000000000000 |
| 1 | /EHICLE WEIGHT I VELOCITY, mp GROSS MP. = 4 GROSS MP. = 4 GROSS MP. = 4 AREA, in. = | * 1bs # 39 * 1 | ODO. RELLING TRACK P COEFFI in induction a interpretation a interpretation a interpretation a interpretation a | COEFFICIENT RESISTANCE, ITCH, In. = 6 CIENT OF FRIC OCOT # CONCEPT *********************************** | 1b/ton = 1.00 .03 .110N = 0.70 .1110N = 0.70 .23 THIN DRIVE MG .25 PROCKET (1b-ft each) .12008.04 | HASS INCR. FO GRADE, X = TORS SPROCKET (hp each) | 0.0 0.0 1.00 1.00 1.00 1.00 1.00 1.00 1 |
| GROSS VEHICLE MAXIMUM VELOC ENGINE GROSS NUMBER OF SPR FRONTAL AREA, | ncy data for | Mestinghous h 10-HaY-85 ceseesses | a induction a sessessesse DISTANCE (ft) | intor #CONCEPT # ################################# | IS THIN DRIVE HOSPESSONS SPROCKET (1b-ft each) 12008.04 | ###################################### | ******* |
| Efficiency dat by Craig ************************************ | RESULTS: | SPEED (mph) | DISTANCE | SPRUCKET (rpm) 0.01 | SPRUCKET (1b-ft each) 12008.04 | SPROCKET (hp each) | |
| 11.00 | New 7 18 | (wph) | (41) | (rpm) | (1b-ft each) 12008.04 | (hp each) | |
| (306) | (168) | | 0 | 0.01 | 12008.04 | | |
| 0.10 | 25350.00 | 00-0 | 00.0 | | | 70.0 | |
| 0.20 | 25349.86 | 16.0 | 0.14 | 15.45 | 12008.04 | 35-31 | |
| 0.30 | 25349.45 | 1.94 | 0.43 | 30.88 | 12008.04 | 10-60 | |
| 0.40 | 25348.77 | 16.5 | 0.85 | 46.31 | 12008.04 | 105.89 | |
| 0.50 | 25347.81 | 3.68 | 1.42 | 61.75 | 12008.04 | 141.18 | |
| 09.0 | 22818-72 | 4.85 | 2.13 | 77-18 | 10896.15 | 160-12 | |
| 0.10 | 19467.64 | 5.72 | 76.2 | 91.07 | 9422.76 | 163.40 | |
| 0.80 | 17206.92 | 94.9 | 3.92 | 102.93 | 8428.95 | 165.18 | |
| 06.0 | 15602.17 | 7.12 | 4.97 | 113.40 | 1123.67 | 166.77 | |
| 1.00 | 14383.55 | 1.12 | 6.10 | 122.90 | 7188.22 | 168-21 | |
| 2.00 | 8926-67 | 12.07 | 21.19 | 192.23 | 4793.51 | 175.45 | |
| 3.00 | 6837.88 | 15.08 | 41.42 | 240.11 | 3879.98 | 177-39 | |
| 4.00 | 5682.46 | 17.48 | 65.53 | 278.30 | 3376.17 | 178.93 | |

| • | | | | | | | |
|------------|----------|----------------|----------|-------------------|-----------------------|--------------------|---|
| TIME (sec) | NET T.E. | SPEED (mph) | DISTANCE | SPROCKET (rpm) | SPRUCKET (1b-ft each) | SPROCKET (hp each) | |
| 9.00 | 4885.13 | 19.51 | 92.85 | 310.60 | 3030.87 | 179.24 | |
| 00-9 | 4302.27 | 21.27 | 122.91 | 338.66 | 2779-11 | 179.20 | |
| 1.00 | 3857.91 | 22.84 | 155.39 | 363.58 | 2588.08 | 179.16 | |
| 8.00 | 3504.53 | 24.25 | 190.04 | 386.06 | 2436.91 | 179-13 | |
| 9.00 | 3214.72 | 25.54 | 226.66 | 406.58 | 2313.55 | 179.10 | |
| 10.00 | 2971.43 | 26.72 | 80-592 | 425.46 | 2210.51 | 179.07 | |
| 11.00 | 2763.38 | 27.82 | 305.18 | 442.97 | 2122.85 | 179.05 | |
| 12.00 | 2582-82 | 28.85 | 346.82 | 459.29 | 2047.15 | 179.02 | |
| 13.00 | 2424-18 | 29.81 | 389.91 | 474.57 | 1980.98 | 179.00 | |
| 14.00 | 2283.37 | 30.71 | 434.37 | 488.93 | 1922.55 | 178.98 | |
| 15.00 | 2157.31 | 31.56 | 480.10 | 502.48 | 1870.50 | 178.96 | |
| 16.00 | 243.59 | 32.37 | 527.05 | 515.30 | 1823.78 | 178.94 | |
| 17.00 | 1940.35 | 33.13 | 575.14 | 527.46 | 1781.57 | 178.92 | • |
| 18.00 | 1846.08 | 33.86 | 624.32 | 539.01 | 1743.23 | 178.91 | |
| 19.00 | 1759.58 | 34.55 | 674.54 | 550.01 | 1708.21 | 178.89 | |
| 20.00 | 1679.86 | 35.21 | 125.15 | 560.50 | 1676.09 | 178.87 | |
| 21.00 | 1606.09 | 35.84 | 117.89 | 570.52 | 1646.51 | 178.86 | |
| 22.00 | 1535.51 | 36.44 | 830.94 | 580.11 | 1618.26 | 178.74 | |

| TIME | NET T.E | 00000 | DIETANCE | *********** | *************************************** | |
|-------|----------|-------|-----------|-------------|---|-----------|
| (300) | (168) | (mph) | CFO | (rpm) | (1b-ft each) | (hp each) |
| 23.00 | 1469.14 | 37.01 | 884.85 | 589.27 | 1591.77 | 178.60 |
| 24.00 | 1407.25 | 37.56 | 939.59 | 598.04 | 1567.18 | 178.45 |
| 25.00 | 1349.37 | 38.09 | 995.11 | 606.45 | 1544.29 | 178.32 |
| 26.00 | 11295.11 | 38.60 | 1051.39 . | 614.52 | 1522.91 | 178-19 |
| 27.00 | 1266.12 | 39.09 | 1108.40 | 622-26 | 1502.91 | 178.07 |
| 28.00 | 1196.12 | 39.55 | 1166.10 | 629.70 | 1484.15 | 177.95 |
| 29.00 | 1150.83 | 40.00 | 1224.48 | 636.86 | 1466.52 | 177.83 |
| 30.00 | 1108.03 | 40-64 | 1283.50 | 643.75 | 1449.93 | 177.72 |
| 31.00 | 1067.51 | 40.85 | 1343.14 | 650.38 | 1434.28 | 177-61 |
| 32.00 | 1029.09 | 41.25 | 1403.38 | 656.77 | 1419.50 | 177.51 |
| 33.00 | 992.62 | 41.64 | 1464.20 | 662.94 | 1405.51 | 177-41 |
| 34.00 | 951.95 | 42.01 | 1525.58 | 668.89 | 1392.26 | 177.32 |
| 35.00 | 954.94 | 42.38 | 1587.49 | 674.63 | 1379-70 | 177.22 |
| 36.00 | 893.49 | 42.72 | 1649.93 | 680.17 | 1367.77 | 177-14 |
| 37.00 | 863.49 | 43.06 | 1712.86 | 685.53 | 1356.42 | 177.05 |
| 38.00 | 834.83 | 43.39 | 1776.28 | 690.71 | 1345.62 | 176-97 |
| 39.00 | 807.44 | 43.70 | 1840.16 | 695.71 | 1335.33 | 176.89 |
| 40.00 | 781.24 | 44.00 | 1904.50 | 700.56 | 1325.51 | 176.81 |

| TIME (sec) | NET T.E. | SPEED (mph) | DISTANCE (ft) | SPRUCKET (rpm) | SPROCKET (1b-ft each) | SPROCKET (hp each) |
|------------|----------|-------------|------------------|-------------------|-----------------------|-----------------------|
| 11.00 | 756-15 | 44.30 | 1969.28 | 105.25 | 1316.14 | 176.73 |
| 42.00 | 732.10 | 44.58 | 2034.48 | 109.78 | 1307.19 | 176.66 |
| 43.00 | 109.04 | 44.86 | 2100.09 | 714.18 | 1298.63 | 176.59 |
| 43.50 | 697.36 | 45.00 | 2146.25 | 716.42 | 1294.30 | 176.55 |

| | | | VEHICLE. | ACCELERATION | VEHICLE ACCELERATION CHARACTERISTICS | | |
|---|--|--------------------------------------|---------------------------------|---|---|---|--------------------|
| 8 Y : | T: W.E. RODLER R.E.LEWIS | œ | DPERATOR | DPERATOR: R LEWIS PURPUSE: ELECTRIC DRIVE PROPUSAL | VE PROPUSAL | REV. DATE: 31 MAY 1985 RUN DATE:7-JUL-85:15 | 1985 |
| **** | ********** | ***** | **** | ******* | **** | 在中央企业中的企业的企业,并不会企业的企业,并不会企业,并不会企业,并不会会会会会会会会会会会会会会会会会会会会会会会会会会会会会会会会会会会会 | ******** |
| 0 V | DATA IMPUT: | | | | | | |
| ROSS V IAXIMUM NGINE UMBER RBNTAL | GROSS VEHICLE WEIGHT, 1bs = MAXINUM VELOCITY, mph = 45.0 engine GROSS MP. = 440.0 NUMBER OF SPROCKET TEETH = 11 FRUNTAL AREA, in. = 57.0 | 45.0 45.0 | 39000- ROLLIN TRACK COEFF | COEFFICIENT OF DRAG = : ROLLING RESISTANCE, 1b/ton = 100 FRACK PITCH, in, = 6.03 COEFFICIENT OF FRICTION * 0.70 | COEFFICIENT OF DRAG = 1.00 ROLLING RESISTANCE, 15/ton = 100.0 Frack Pitch, in. = 6.03 Coefficient of Friction = 0.70 | MASS INCR. FOR RIGRADE, \$ \$ 0.0 | FOR ROT, \$ =47.20 |
| fficie | ncy data for y Craig Josep | Westinghour h 10-MAY-85 ****** | se induction | motor #CONCEP # ################################## | Efficiency data for Westinghouse Induction motor aCONCEPT II: PROPULSION/STEER MOTOR by Craig Joseph 10-MAY-85 seemesteesseesseesseesseesseesseesseesse | Efficiency data for Mestinghouse induction motor #CONCEPT II: PROPULSION/STEER MOTOR by Craig Joseph 10-MAY-85 ************************************ | ***** |
| æ 1 | RESULTS: | | | | | | |
| TIME (Sec) | NET T.E. | SPEED (mph) | DISTANCE (ft) | SPROCKET (rpm) | SPROCKET (1b-ft each) | SPROCKET (hp each) | |
| 0.10 | 25350.00 | 00.0 | 0.00 | 0.01 | 12008-04 | 0.02 | • |
| 0.20 | 25349.86 | 16.0 | 0.14 | 15.45 | 12008.04 | 35.31 | |
| 0.30 | 25349.45 | 1.94 | 0.43 | 30.88 | 12008.04 | 10.60 | |
| 0.40 | 25348.77 | 2.91 | 0.85 | 46.31 | 12008.04 | 105.89 | |
| 0.50 | 25347.81 | 3.88 | 1.42 | 61.75 | 12008.04 | 141.18 | • |
| 09.0 | 22352-57 | 4.85 | 2.13 | 17.18 | 10559.16 | 155.17 | |
| 0.10 | 18903.04 | 5.69 | 2.97 | 90.61 | 9174.39 | 158.27 | |
| 0.80 | 16747.82 | 6.41 | 3.91 | 102.11 | 8226.97 | 159.96 | |
| 06-0 | 15207.34 | 7.05 | 46.4 | 112.31 | 1549.93 | 161.45 | |
| 1.00 | 14 03 2.38 | 7.64 | 90.9 | 121.57 | 7033.67 | 162.81 | |
| 2.00 | 8744.13 | 11.89 | 20.95 | 189.34 | 4712.94 | 169.91 | |
| 3.00 | 6698.23 | 14.84 | 40.86 | 236.25 | 3818.09 | 171.75 | |
| 00.4 | 5564.87 | 17.19 | 64.57 | 273.65 | 3324.40 | 173.22 | |
| | | | | | | | |

| TIME | NET T.E. | SPEED | DISTANCE | SPROCKET | SPROCKET | SPROCKET |
|-------|----------|-------|----------|----------|--------------|-----------|
| (20C) | (188) | (mph) | CEO | (rpm) | (Ib-ft each) | (hp each) |
| 00.5 | 4789.87 | 19.18 | 91.43 | 305.31 | 2988.15 | 173.71 |
| 90.9 | 4216.87 | 16.02 | 120.97 | 332.82 | 2740.55 | 173.67 |
| 7.00 | 3780.05 | 22.44 | 152.89 | 357.24 | 2552.68 | 173.63 |
| 00.8 | 3432.69 | 23.82 | 186.93 | 379.27 | 2403.99 | 173.60 |
| 00.6 | 3147.85 | 25.08 | 222.91 | 399-36 | 2282.66 | 173.57 |
| 10.00 | 2908.75 | 26.25 | 260.64 | 417.85 | 2181.32 | 173.55 |
| 11.00 | 2704.33 | 27.32 | 300.02 | 434.98 | 2095.10 | 173.52 |
| 12.00 | 2526.94 | 28.33 | 340.91 | 450.95 | 2020-65 | 173.50 |
| 13.00 | 2371.11 | 29.26 | 383.22 | 465.90 | 1955.58 | 173.48 |
| 14.00 | 2232.82 | 30.15 | 426.85 | 419.95 | 1898.11 | 173.46 |
| 15.00 | 2109.03 | 30.98 | 471.75 | 493.20 | 1846.92 | 173.44 |
| 16.00 | 1997.38 | 31.17 | 517.82 | 505.73 | 1800.98 | 173.42 |
| 17.00 | 1896.03 | 32.51 | \$65.02 | 517.61 | 1759.47 | 173.40 |
| 18.00 | 1803.51 | 33.22 | 613.28 | 528.89 | 1721.17 | 173.39 |
| 19.00 | 1718.63 | 33.90 | 662.55 | 539.64 | 1687.34 | 173.37 |
| 20.00 | 1640.41 | 34.54 | 712.79 | 549.88 | 1655.75 | 173.36 |
| 21.00 | 1568.04 | 35.15 | 763.95 | 559.67 | 1626.67 | 173.34 |
| 22.00 | 1500.85 | 35.74 | 815.98 | 569.03 | 1599.79 | 173.33 |

| 1 1 | | | | | | | |
|------------|----------|----------------|----------|-------------------|-----------------------|--------------------|--|
| TIME (Sec) | NET T.E. | SPEED (mph) | DISTANCE | SPROCKET (rpm) | SPROCKET (16-ft each) | SPROCKET (hp each) | |
| 23.00 | 1436.85 | 36.31 | 868-86 | 517.99 | 1574.24 | 173.25 | |
| 24.00 | 1376.04 | 36.84 | 922.55 | 586.57 | 1550.02 | 173.11 | |
| 25.00 | 1319.18 | 37.36 | 977.00 | 594.79 | 1527.47 | 172.99 | |
| 26.00 | 1265.89 | 37.86 | 1032.20 | 602.68 | 1506.41 | 172.86 | |
| 27.00 | 1215.82 | 38.33 | 1088.11 | 610.24 | 1486.72 | 172.75 | |
| 28.00 | 1168.70 | 38.79 | 1144.70 | 617.52 | 1468.24 | 172.63 | |
| 29.00 | 1124.24 | 39.23 | 1201.94 | 624.51 | 1450.89 | 172.52 | |
| 30.00 | 1082.24 | 39.65 | 1259.82 | 631.24 | 1434.55 | 172.42 | |
| 31.00 | 1042.49 | 40.04 | 1318.30 | 637.72 | 1619.15 | 172.32 | |
| 32.00 | 1004.61 | 40.45 | 1377.37 | 643.96 | 1404.60 | 172.22 | |
| 33.00 | 969.04 | 40.83 | 1437.00 | 86.649 | 1390.83 | 172-13 | |
| 34.00 | 935.04 | 41.19 | 1497-17 | 655.78 | 1377.80 | 172.04 | |
| 35.00 | 89.206 | 41.54 | 1557.87 | 661-39 | 1365.43 | 171.95 | |
| 36.00 | 871.85 | 41.88 | 1619.08 | 666.80 | 1353.69 | 171.87 | |
| 37.00 | 842.44 | 42.21 | 1680.77 | 672.02 | 1342.52 | 171.78 | |
| 38.00 | 814.36 | 42.53 | 1742.94 | 677.08 | 1331.90 | 171-11 | |
| 39.00 | 787.53 | 45.84 | 1805.57 | 681.96 | 1321.77 | 171.63 | |
| 40.00 | 761.86 | 43.13 | 1868.63 | 686.68 | 1312-12 | 171.56 | |

| TIME | NET T.E. | SPEED | DISTANCE | SPROCKET | SPROCKET | SPROCKET | |
|-------|----------|-------|----------|----------|----------|-----------|--|
| (305) | (101) | (udm) | (31) | (EQ1) | 1202 021 | Cub each) | |
| 41.00 | 131.63 | 74.64 | 61.7661 | 63.160 | 06.7051 | 04-141 | |
| 45.00 | 713.74 | 43.70 | 1996.03 | 892.68 | 1294-10 | 171.42 | |
| 43.00 | 691-16 | 43.97 | 2060.34 | 96*669 | 1285.68 | 171.35 | |
| 44.00 | 05.699 | 44.23 | 2125.04 | 104.11 | 1277-62 | 171.28 | |
| 45.00 | 648.70 | 87.44 | 2190.11 | 708.13 | 1269.91 | 171.22 | |
| 46.00 | 628.71 | 44.72 | 2255.54 | 712.02 | 1262.52 | 171-16 | |
| 47.00 | 69*609 | 96*** | 2321.33 | 715.80 | 1255.43 | 171.10 | |
| 47.10 | 606.35 | 45.00 | 2341.13 | 716.42 | 1254.27 | 171.09 | |

| The control of the | | | | VEHICLE AC | CELERATION C | VEHICLE ACCELERATION CHARACTERISTICS | | | |
|---|---|--|---------------------------------|---------------------------|--|--|------------------------------|--|--------|
| Color Colo | 60 | | æ | OPERATOR: R PURPOSE: E | LENIS LECTRIC DRIV | E PROPOSAL | REV.DATE: 31 RUN DATE: 7- | MAY 1985 AUG-85:13 | |
| ###################################### | ***** | ****** | *** | *** | ****** | *** | **** | **** | ** |
| MAXIMUM VELLCITY, meh. a. 4.0 TALLE MESITAMEF, LIVA in = 10.0 | āi | ATA INPUT: | | | | | | | |
| ###################################### | GROSS N MAXIMUN ENGINE NUMBER FRONTAL | VEHICLE WEIGHT H VELDCITY, mp GROSS HP. = 4 OF SPROCKET T L AREA, In. == | 45.0 | | COEFFICIENT RESISTANCE, TCH, in. = 6 IENT OF FRIC | 0F DRAG = 1.00 1b/ton = 100.0 .03 IION = 0.70 | | OR ROT. \$ =2. | 8 • 40 |
| FSULTS: HET T.E. SPEED DISTANCE SPROCKET SPROCKET Clbs | - 00 | Efficiency dat given by Ge htettetett | a for Homopolarine Selder 20-MK | · motor IV-85 | #CONCEPT I | 2 THIN DRIVE MOTO | 1R.S :************* | ; \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | ** |
| HET T.E. SPEED DISTANCE (TPM) (1b-ft each) (hp (1bs) (ft) (ft) (rpm) (1b-ft each) (hp 25350.00 0.00 0.00 0.01 12008.04 12349.82 1.11 0.16 17.70 12008.04 120349.28 2.22 0.49 35.40 12008.04 1208.04 12348.38 3.33 0.98 53.09 12008.04 11242.81 119175.76 5.48 2.43 87.26 9294.20 11242.81 119175.76 5.48 2.43 87.26 9294.20 11242.81 113654.31 7.71 5.53 1122.67 6867.44 112671.76 8.30 6.74 132.20 6435.88 112671.76 8.30 6.74 132.20 6435.88 112671.76 8.30 6.74 2250.39 3535.92 115605.64 18.19 69.08 289.66 3078.50 11 | 2 | ESULTS: | | | | | | | |
| 25349.28 1.11 0.16 17.70 12008.04 25349.28 2.22 0.49 35.40 12008.04 25348.38 3.33 0.98 53.09 12008.04 23607.38 4.45 1.63 70.79 11242.81 1 19175.76 5.48 2.43 87.26 9294.20 1 16631.74 6.32 3.36 100.65 8175.83 1 14916.52 7.05 4.40 112.26 7422.01 1 13654.31 7.11 5.53 122.67 6435.88 1 12671.76 8.30 6.74 132.20 6435.88 1 1907.54 12.71 22.73 202.31 4346.24 1 5000.64 18.17 43.94 250.99 3535.92 1 | TIME (Sec) | NET T.E. | | STANCE (ft) | SPROCKET (rpm) | SPROCKET (16-ft each) | SPROCKET (hp each) | | |
| 25349.82 1.11 0.16 17,70 12008.04 25349.28 2.22 0.49 35.40 12008.04 25348.38 3.33 0.98 53.09 12008.04 23607.38 4.45 1.63 70.79 11242.81 19175.76 5.48 2.43 87.26 9294.20 16631.74 6.32 3.36 100.65 6175.83 1 14916.52 7.05 4.40 112.26 7422.01 1 13654.31 7.71 5.53 122.67 6867.44 1 12671.76 8.30 6.74 132.20 6435.86 1 7907.54 12.71 22.73 202.31 4346.24 1 6052.60 15.77 43.94 250.99 3535.92 1 5000.64 18.19 69.08 289.66 3078.50 1 | 0.10 | 25350.00 | 0.00 | 00.0 | 0.01 | 12068.04 | 0.02 | | |
| 25349.28 2.22 0.49 35.40 12008.04 25348.38 3.33 0.98 53.09 12008.04 23607.38 4.45 1.63 70.79 11242.81 19175.76 5.48 2.43 87.26 9294.20 16631.74 6.32 3.36 100.65 8175.83 14916.52 7.05 4.40 112.26 7422.01 13654.31 7.71 5.53 122.67 6435.86 12671.76 8.30 6.74 132.20 6435.86 1907.54 12.71 22.73 202.31 4346.24 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 0.20 | 25349.82 | 1.11 | 0.16 | 17.70 | 12008.04 | 40.48 | | |
| 25346.38 3.33 0.98 53.09 12008.04 23607.38 4.45 1.63 70.79 11242.81 19175.76 5.48 2.43 87.26 9294.20 16631.74 6.32 3.36 100.65 8175.83 14916.52 7.05 4.40 112.26 7422.01 13654.31 7.71 5.53 122.67 6867.44 12671.76 8.30 6.74 132.20 6435.88 1907.54 12.71 22.73 202.31 4346.24 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 0.30 | 25349.28 | 2.22 | 64.0 | 35.40 | 12008.04 | 80.93 | | |
| 23607.38 4.45 1.63 70.79 11242.81 19175.76 5.48 2.43 87.26 9294.20 16631.74 6.32 3.36 100.65 8175.83 14916.52 7.05 4.40 112.26 7422.01 13654.31 7.71 5.53 122.67 6867.44 12671.76 8.30 6.74 132.20 6435.88 1907.54 12.71 22.73 202.31 4346.24 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 0.40 | 25348.38 | 3.33 | 96.0 | 53.09 | 12008.04 | 121.39 | | |
| 19175.76 5.48 2.43 87.26 9294.20 16631.74 6.32 3.36 100.65 8175.83 14916.52 7.05 4.40 112.26 7422.01 13654.31 7.71 5.53 122.67 6867.44 12671.76 8.30 6.74 132.20 6435.88 7907.54 12.71 22.73 202.31 4346.24 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 0.50 | 23607.38 | 4.45 | 1.63 | 10.79 | 11242.81 | 151.53 | | |
| 16631.74 6.32 3.36 100.65 8175.83 14916.52 7.05 4.40 112.26 7422.01 13654.31 7.71 5.53 122.67 6867.44 12671.76 8.30 6.74 132.20 6435.88 1907.54 12.71 22.73 202.31 4346.24 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 09.0 | 19175.76 | 5.48 | 2.43 | 87.26 | 9294.20 | 154.42 | | |
| 14916.52 7.05 4.40 112.26 7422.01 13654.31 7.71 5.53 122.67 6867.44 12671.76 8.30 6.74 132.20 6435.88 7907.54 12.71 22.73 202.31 4346.24 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 0.10 | 16631.74 | 6.32 | 3.36 | 100.65 | 8175.83 | 156.68 | | |
| 13654.31 7.71 5.53 122.67 6867.44 12671.76 8.30 6.74 132.20 6435.88 7907.54 12.71 22.73 202.31 4346.24 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 0.80 | 14916.52 | 7.05 | 0+-+ | 112,26 | 7422.01 | 158.64 | | |
| 12671.76 8.30 6.74 132.20 6435.88 7907.54 12.71 22.73 202.31 4346.24 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 06-0 | 13654.31 | 1.11 | 5.53 | 122.67 | 6867.44 | 160.40 | | |
| 7907.54 12.71 22.73 202.31 4346.24 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 1.00 | 12671.76 | 8.30 | 41.9 | 132.20 | 6435.88 | 162.00 | | |
| 6052.60 15.77 43.94 250.99 3535.92 5000.64 18.19 69.08 289.66 3078.50 | 2.00 | 1901-54 | 12.71 | 22.13 | 202,31 | 4346.24 | 167-42 | | |
| 5000.64 18.19 69.08 289.66 3078.50 | 3.00 | 6052-60 | 15.77 | 43.94 | 250.99 | 3535.92 | 168.98 | | |
| | 4.00 | 5000.64 | 18.19 | 80.69 | 289.66 | 3078.50 | 169.78 | | |

| TIME (Sec) | (Ibs) | SPEED (mph) | DISTANCE | SPRUCKET (rpm) | SPROCKET (16-ft each) | SPROCKET (hp each) |
|------------|---------|-------------|----------|-------------------|-----------------------|--------------------|
| 5.00 | 4277.75 | 20-23 | 97.45 | 322.14 | 2765.56 | 169.63 |
| 00.9 | 3756.23 | 22.00 | 128.58 | 350.27 | 2540.95 | 169.46 |
| 7.00 | 3355.93 | 23.57 | 162.13 | 375.18 | 2369.45 | 169.26 |
| 8.00 | 3036.46 | 24.97 | 197.85 | 397.56 | 2233.31 | 169.05 |
| 00.6 | 2772.28 | 26.25 | 235.52 | 417.90 | 2121.30 | 168.79 |
| 10.00 | 2550.06 | 27.42 | 274.97 | 436.53 | 2027.58 | 168.53 |
| 11.00 | 2359.36 | 28.50 | 316.07 | 453.71 | 1947.57 | 168.25 |
| 12.00 | 2194-10 | 29.50 | 358.68 | 469.65 | 1878.60 | 167.99 |
| 13.00 | 148-68 | 30.43 | 402.71 | 484.50 | 1818.23 | 167.73 |
| 14.00 | 1918.70 | 31.30 | 44.8.05 | 498.38 | 1764.51 | 167.44 |
| 15.00 | 1799.76 | 32.12 | 494.63 | 511.39 | 1715.51 | 167.04 |
| 16.00 | 1692.13 | 32.89 | 542.37 | 523.61 | 1671.37 | 166.63 |
| 17.00 | 1594.87 | 33.61 | 591.19 | 535.11 | 1631.67 | 166.25 |
| 18.00 | 1506.46 | 34.29 | 641.05 | \$45.96 | 1595.75 | 165.88 |
| 19.00 | 1425.31 | 34.94 | 691.87 | 556.22 | 1562.92 | 165.52 |
| 20.00 | 1349.89 | 35.55 | 743.60 | 565.93 | 1532.50 | 165.13 |
| 21.00 | 1280.22 | 36.13 | 196.21 | 575-13 | 1504.51 | 164.75 |
| 22.00 | 1215.02 | 36.67 | 849.64 | 583.85 | 1478.39 | 164.35 |

| *** | A + 100 | 2000 | STATE OF STATE | ******** | ****** | |
|-------|---------|-------|----------------|----------|--------------|-----------|
| (305) | (168) | (mph) | CFD | (rpm) | (1b-ft each) | (hp each) |
| 23.00 | 1154.66 | 37.19 | 903.85 | 592.14 | 1454.31 | 163.97 |
| 24.00 | 1098.61 | 37.69 | 958-80 | 600.02 | 1432.03 | 163.60 |
| 25.00 | 1046.41 | 38.16 | 1014.46 | 607.53 | 1411.36 | 163.26 |
| 26.00 | 1002.02 | 38.61 | 1070.80 | 614.69 | 1394.05 | 163.16 |
| 27.00 | 954.99 | 39.04 | 1127.17 | 621.53 | 1375.50 | 162.78 |
| 28.00 | 910.96 | 39.45 | 1185.37 | 628.06 | 1358.20 | 162-42 |
| 29.00 | 869.67 | 39.86 | 1243.54 | 634.29 | 1342.03 | 162.08 |
| 30.00 | 830.87 | 40.21 | 1302.28 | 640.23 | 1326.88 | 161.75 |
| 31.00 | 194.29 | 40.57 | 1361.55 | 645.92 | 1312.64 | 161.43 |
| 32.00 | 159.56 | 40.91 | 1421.33 | 651.35 | 1299.15 | 161-12 |
| 33.00 | 726.80 | 41.24 | 1481.61 | 656.55 | 1286.46 | 160-82 |
| 34.00 | 695.84 | 41.55 | 1542.34 | 661.52 | 1274.50 | 160.53 |
| 35.00 | 566.56 | 41.85 | 1603.53 | 62.999 | 1263.22 | 160.26 |
| 36.00 | 638.82 | 45.14 | 1665-14 | 670.85 | 1252.56 | 159.99 |
| 37.00 | 612.52 | 42.41 | 1127.17 | 675.23 | 1242.48 | 159.74 |
| 38.00 | 587.56 | 42.68 | 1789.59 | 679.42 | 1232.94 | 159.50 |
| 39.00 | 563.85 | 42.93 | 1852.39 | 683.45 | 1223.90 | 159-27 |
| 40.00 | 541.30 | 43.17 | 1915.55 | 687,31 | 1215-32 | 40 021 |

| TIME | NET T.E. | SPEED | DISTANCE | SPROCKET (rpm) | CIb-ft each) | SPROCKET (hp each) | |
|-------|----------|-------|----------|-------------------|--------------|-----------------------|--|
| 41.00 | ,19.84 | 43.40 | 1979.05 | 691.02 | 1207-18 | 158.83 | |
| 42.00 | 499.41 | 43.63 | 2042.90 | 694.59 | 1199.44 | 158.63 | |
| 43.00 | 479.93 | 43.84 | 2107.06 | 698.01 | 1192.08 | 158.43 | |
| 44.00 | 461.36 | 44.05 | 2171.53 | 701.30 | 1185.07 | 158.24 | |
| 45.00 | 443.63 | 44.25 | 2236.30 | 104.47 | 1178.40 | 158.06 | |
| 00-94 | 426.70 | ***** | 2301.35 | 107.51 | 1172.04 | 157.89 | |
| 47.00 | 410.52 | 44.62 | 2366.68 | 710.44 | 1165.98 | 157-72 | |
| 48.00 | 395.06 | 44.80 | 2432.27 | 713.25 | 1160.19 | 157.56 | |
| 49.00 | 380.26 | 16.91 | 2498-12 | 715.96 | 1154.66 | 157.41 | |
| 49.10 | 317.19 | 45.00 | 2517.92 | 716.42 | 1153.74 | 157.38 | |

| | | | VEHICLE ! | ACCELERATION (| VEHICLE ACCELERATION CHARACTERISTICS | |
|---|---|----------------------------|---------------------------|--|---|---|
| . ¥ 8 | W.E. RODLER R.E.LEWIS | œ | PURPOSE | OPERATOR:R LEWIS PURPOSE:ELECTRIC DRIVE PROPOSAL | /E PROPOSAL | REV. DATE: 31 MAY 1985 RUN DATE:12-AUG-85:101 |
| ****** | **** | *** | **** | **** | | 李章章章章章章章章章章李章李章李章李章李章李章李章李章李章李章李章李章李章李 |
| DA1 | DATA INPUT: | | | | | |
| GROSS VI HAXIMUM ENGINE P NUMBER (| GROSS VEHICLE HEIGHT, 15s = MAXIMUW VELOCITY, MAX. ENGINE NET HP. # 880.0 NUMBER OF SPROCKET TEETH # 11 FRONTAL AREA, in. # 68.3 | 0 - | 80000. ROLLING TRACK I | COEFFICIENT OF C ROLLING RESISTANCE, 16/16/ TRACK PITCH, 11. * 7.63 COEFFICIENT OF FRICTION | COEFFICIENT OF DRAG = 1.00 ROLLING RESISTANCE, 15/ton = 100.0 TRACK PITCH, in. = 7.63 COEFFICIENT OF FRICTION = 0.70 | MASS INCR. FOR ROT, \$ =47.20 Grade, \$ = 0.0 |
| Efficies | ncy date for Creig Josep | Westinghous h 10-NAY-85 | e induction : | sotor aconcep' | Efficiency data for Westinghouse induction motor aCONCEPT I: TWIN DRIVE MOTORS by Craig Joseph 10-NAY-85 assessassessessessessessessessessesses | Efficiency data for Westinghouse induction motor aCONCEPT I: TWIN DRIVE MOTORS by Craig Joseph 10-NAV-85 anabasasasasasasasasasasasasasasasasasas |
| ex. | RESULTS: | | | | | |
| TIME (30C) | NET T.E. | SPEED (mph) | DISTANCE | SPROCKET (rpm) | SPROCKET (16-ft each) | SPRUCKET (hp each) |
| 0.10 | 52000.00 | 0.00 | 00-0 | 0.01 | 31147.28 | 90.08 |
| 0.20 | 51999.84 | 16.0 | 0.14 | 12.21 | 31147.29 | 72.44 |
| 0.30 | 51999.34 | 1.94 | 0.43 | 24.42 | 31147.28 | 144.82 |
| 0.40 | 51998.52 | 2.91 | 0.85 | 36.63 | 31147.28 | 217.21 |
| 0.50 | 51997.38 | 3.88 | 1.42 | 48.83 | 31147.28 | 289.59 |
| 09.0 | 45539.65 | 4.85 | 2.13 | 61.04 | 27556-31 | 320.24 |
| 0.10 | 39001.55 | 5.70 | 2.97 | 11.73 | 23920-67 | 326.68 |
| 0.80 | 34540.13 | 6.42 | 3.91 | 80.88 | 21440.08 | 330.17 |
| 0.90 | 31355.77 | 1.01 | 4.95 | 88.99 | 19669-78 | 333.27 |
| 1.00 | 28929.23 | 7.65 | 6-07 | 96.35 | 18320.97 | 336.09 |
| 2.00 | 18022-87 | 11.93 | 20.99 | 150.20 | 12262.97 | 350.71 |
| 3.00 | 13816.69 | 14.89 | 86.04 | 187.49 | 9931.20 | 354.53 |
| 00-4 | 11490-17 | 17.26 | 84.78 | 217.25 | 8644.56 | 357.58 |
| | | | | | | |

| 2477 | NET T.E | COEED | STOTANCE | CDDOCKET | CDDOCKET | CDOOLET | |
|-------|---------|-------|----------|----------|--------------|-----------|--|
| (38C) | (168) | (mph) | (44) | (rom) | (1b-ft each) | (hp each) | |
| 2.00 | 9897.58 | 19.26 | 91.74 | 245.45 | 1765.85 | 358.50 | |
| 00-9 | 8724.48 | 21.00 | 121.41 | 264.38 | 7120.18 | 358.42 | |
| 7.00 | 7831.26 | 22.55 | 153.48 | 283.87 | 6629.92 | 358.34 | |
| 8.00 | 7121.83 | 23.94 | 187.69 | 301.47 | 6241.64 | 358.28 | |
| 00-6 | 6540.77 | 25-22 | 223.86 | 317.55 | 5924.55 | 358.22 | |
| 10.00 | 6053.56 | 26.40 | 261.81 | 332.38 | 14.6595 | 358.16 | |
| 11.00 | 5637.45 | 27.49 | 301.42 | 346.13 | 5433.74 | 358.11 | |
| 12.00 | 5276.73 | 28.51 | 342.57 | 358.97 | 5238.66 | 358.06 | |
| 13.00 | 4960.16 | 29.47 | 385.17 | 371.02 | 5067.96 | 358.02 | |
| 14.00 | 4679.47 | 30.37 | 429.12 | 382.36 | 4917.08 | 357.98 | |
| 15.00 | 4428.41 | 31.22 | 474.36 | 393.07 | 4782.52 | 357.94 | |
| 16.00 | 4202.15 | 32.03 | 520.80 | 403.22 | 4661.63 | 357.90 | |
| 17.00 | 3996.91 | 32.79 | 568.40 | 412.87 | 4552.29 | 357.86 | |
| 18.00 | 3809.66 | 33.52 | 617.09 | 422.05 | 4452.84 | 357.83 | |
| 19.00 | 3637.96 | 34.22 | 666.82 | 430.80 | 4361.92 | 357.79 | |
| 20.00 | 3479.82 | 34.88 | 711.54 | 439.17 | 4278.42 | 357.76 | |
| 21.00 | 3333.56 | 35.52 | 769.22 | 447.19 | 4201.42 | 357.73 | |
| 22.00 | 3196.57 | 36.13 | 821.81 | 454.86 | 4129.46 | 357.64 | |

| TIME (sec) | NET T.E. | SPEED (mph) | DISTANCE | SPROCKET (rpm) | SPROCKET (1b-ft each) | SPRUCKET (hp each) | |
|------------|----------|-------------|----------|-------------------|-----------------------|-----------------------|--|
| 23.00 | 3064.76 | 36.71 | 875.27 | 462.23 | 4060.29 | 357.35 | |
| 24.00 | 2941.88 | 37.27 | 929.57 | 469.29 | 3995.97 | 357.06 | |
| 25.00 | 2827.00 | 37.81 | 984.68 | 476.07 | 3936.00 | 356.78 | |
| 26.00 | 2719.31 | 38.33 | 1040.56 | 482.59 | 3879.94 | 356.52 | |
| 27.00 | 2618.14 | 38.83 | 1097.18 | 488.87 | 3827.40 | 356.26 | |
| 28.00 | 2522.87 | 39.31 | 1154.52 | 16.464 | 3778.05 | 356.02 | |
| 29.00 | 2432.99 | 39.77 | 1212.55 | 500-74 | 3731.61 | 355.78 | |
| 30.00 | 2348.04 | 40.22 | 1271.24 | 506.36 | 3687.83 | 355.55 | |
| 31.00 | 2267.60 | 40.65 | 1330.58 | 511.78 | 3646.47 | 355.33 | |
| 32.00 | 2191.31 | 41.07 | 1390.54 | 517.02 | 3607.34 | 355.12 | |
| 33.00 | 2118.86 | 41.47 | 1451.09 | 522.09 | 3570.27 | 354.91 | |
| 34.00 | 2049.95 | 41.86 | 1512.23 | \$26.99 | 3535.09 | 354.71 | |
| 35.00 | 1984.32 | 42.23 | 1573.92 | 531.73 | 3501.66 | 354.52 | |
| 36.00 | 1921.75 | 42.60 | 1636-16 | 536.32 | 3469.86 | 354.33 | |
| 37.00 | 1862.02 | 42.95 | 1698.93 | 540.77 | 3439.57 | 354.15 | |
| 38.00 | 1804.94 | 43.29 | 1762.20 | 545.08 | 3410.69 | 353.98 | |
| 39.00 | 1750.34 | 43.63 | 1825.97 | 549.26 | 3383.12 | 353.81 | |
| 00.04 | 1698.06 | 43.95 | 1890.21 | 553.31 | 3356.78 | 353.65 | |

| 1 | | | | | | |
|------------|----------|-------------|------------------|-------------------|--------------------------|-----------------------|
| TIME (Sec) | NET T.E. | SPEED (Rph) | DISTANCE (ft) | SPROCKET (rpm) | SPRUCKET (1b-ft each) | SPROCKET (hp each) |
| 41.00 | 1647.96 | 44.26 | 1954.92 | 557.24 | 3331.59 | 353.49 |
| 42.00 | 1599.90 | 44.56 | 2020-08 | 561.06 | 3307.47 | 353,33 |
| 43.00 | 1553.17 | 44.86 | 2085.68 | 564.17 | 3284.37 | 353.18 |
| 63.40 | 1531.66 | 45.00 | 2125.24 | 566.56 | 3273.32 | 353.11 |

| | | | VEHICLE | ACCELERATION (| VEHICLE ACCELERATION CHARACTERISTICS | |
|---|--|--|---------------------------------------|---|---|--|
| 6 | BY: W.E. RODLER R.E.LEWIS | ~ | PURPOSE | OPERATOR:R LEWIS PURPOSE:ELECTRIC DRIVE PROPOSAL | FE PROPOSAL | REV. DATE: 31 MAY 1985 RUN DATE:12-AUG-85:102 |
| ***** | *** | *** | **** | **** | ***** | 在企业的电影中的,是一个,是一个,是一个,是一个,是一个,是一个,是一个,是一个,是一个,是一个 |
| 10 | DATA INPUT: | | | | | |
| GROSS V MAXIMUP ENGINE NUMBER FRONTAL | GROSS VEHICLE MEIGHT, 1bs = 45. MAZIMUM VELOCITY, mph = 45. ENGINE NET HP. = 880.0 NUMBER OF SPROCKET TEETH = 1 FRONTAL AREA, in. = 68.3 | 1bs = 80 h = 45.0 0 = 11 EETH = 11 | 80000. ROLLING TRACK PI COEFFIC | 2 | COEFFICIENT OF DRAG = 1.00 RESISTANCE, 1b/ton = 100.0 TCH, in. = 7.63 HENT OF FRICTION = 0.70 | MASS INCR. FOR ROT. \$ =47.20 Srade, \$ = 0.0 |
| Efficia besesses | ency data for Mestinghous by Craig Joseph 10-MAY-85 :#################################### | Westinghous h 10-mar-85 ************************************ | e induction | motor #CONCEP1 # ********* | Efficiency data for Mestinghouse induction motor ¢CONCEPT II: PROPULSION/STEER MOTOR by Craig Joseph 10-MAY-85 by Craig Joseph 10-MAY-85 ************************************ | Efficiency data for Westinghouse induction motor ¢CONCEPT II: PROPULSION/STEER MOTOR by Craig Joseph 10-MAY-85 strotestr |
| 2 1 | RESULTS: | | | | | |
| TIME (SOC) | NET T.E. | SPEED (mph) | DISTANCE | SPROCKET (rpm) | SPROCKET (1b-ft each) | SPROCKET (hp each) |
| 0.10 | 52000.00 | 00.0 | 00.00 | 0.01 | 31147.28 | 0.05 |
| 0.20 | \$1999.84 | 16.0 | 0.14 | 12.21 | 31147.28 | 72.44 |
| 0.30 | 51999.34 | 1.94 | 0.43 | 24.42 | 31147.28 | 144.82 |
| 0.40 | 51998.52 | 16.2 | 0.85 | 36.63 | 31147.28 | 217.21 |
| 0.50 | 51997.38 | 3.88 | 1.42 | 48.83 | 31147.28 | 289.59 |
| 09.0 | 44007.37 | 4.85 | 2.13 | 61.04 | 26704.05 | 310.34 |
| 0.70 | 37863.94 | 5.67 | 2.96 | 11.37 | 23287.90 | 316.44 |
| 0.80 | 33612.46 | 6.37 | 3.90 | 80.25 | 20924.05 | 319.73 |
| 06.0 | 30556.95 | 7.00 | 4.93 | 88.14 | 19225.38 | 322,65 |
| 1.00 | 28218.30 | 1.57 | 90.9 | 95.32 | 17925.43 | 325.32 |
| 2.00 | 17652.18 | 11.75 | 20.75 | 147.96 | 12056.38 | 339.64 |
| 3.00 | 13532.98 | 14.65 | 40.42 | 184.47 | 9772.71 | 343.26 |
| 4.00 | 11251.00 | 16.91 | 63.83 | 213.62 | 8510.58 | 346.16 |
| | | | | | | |

| TIME (IE) (1b) (cp) (cp) (cp) (cp) (cp) (cp) (cp) (cp | • | | ****** | | | | |
|--|------------|----------------|----------------|---------------|----------------|-----------------------|---|
| 10 9703.37 18.93 90.34 238.31 7656.62 10 8550.02 20.64 119.50 259.81 7021.68 1 7671.83 22.15 151.01 278.90 6539.54 0 6403.17 24.77 220.14 311.89 5845.84 0 6403.17 24.77 220.14 311.89 5845.84 0 6403.17 24.77 220.14 311.89 5845.84 0 5924.27 25.93 257.42 326.40 5845.84 0 5924.27 25.93 257.42 326.40 5585.15 0 5160.80 27.99 336.72 356.40 5585.15 1 4849.74 28.93 376.20 5003.48 2 5560.80 27.99 336.72 352.43 5171.32 4849.74 28.93 376.20 5003.48 4055.11 4849.73 30.64 466.07 385.76 4722.82 4105.09 | TINE (sec) | NET T.E. (16s) | SPEED (mph) | DISTANCE (ft) | SPRUCKET (rom) | SPRUCKET (15-ft each) | SPROCKET |
| 0 0550.02 20.64 119.50 259.81 7021.68 0 7671.83 22.15 151.01 276.90 6539.54 0 6974.38 23.52 184.62 296.15 6157.68 0 6403.17 24.77 220.14 311.89 5845.84 0 5924.27 25.93 257.42 326.40 5845.84 0 5924.27 25.93 257.42 326.40 5845.15 0 5515.30 26.99 296.31 339.86 585.15 1 5160.80 27.99 336.72 352.43 5171.32 3 1 4849.74 28.93 378.53 364.20 5003.48 3 1 4849.74 28.93 378.53 364.20 5003.48 3 1 4849.74 28.93 378.53 364.20 5003.48 3 2 4849.74 28.93 376.20 466.07 385.76 4732.82 3 < | 2.00 | 9703.37 | 18.93 | 90.34 | 238.31 | 7656.62 | |
| 0 7671.83 22.15 151.01 278.90 6539.54 0 6974.36 23.52 184.62 296.15 6157.68 0 6403.17 220.14 311.89 5845.84 0 \$924.27 25.93 257.42 326.40 5585.15 0 \$515.30 26.99 296.31 339.86 5363.17 1 \$160.80 27.99 296.31 339.86 5363.17 2 \$515.30 26.93 378.53 364.20 5003.48 3 \$160.80 27.99 336.72 352.43 5171.32 4849.74 \$28.93 378.53 364.20 5003.48 4527.33 30.64 466.07 385.76 4722.82 4105.09 31.43 511.65 395.68 4603.95 3303.53 32.89 606.12 414.06 4398.70 3551.09 33.57 654.91 422.61 4309.32 3395.85 34.22 704.67 430.78 4227.24 3252.30 34.84 755.36 436.09 4151.56 3119.08 35.43 806.93 436.09 4151.56 | 00-9 | 8550.02 | 20.64 | 119.50 | 259.81 | 7021.68 | 34.9 36 |
| 0 6974-38 23.52 184-62 296.15 6157-68 0 6403.17 24.77 220.14 311.89 5845.84 0 5924-27 25.93 257.42 326.40 5585.15 0 5515.30 26.99 296.31 339.86 5585.15 0 5160.80 27.99 336.72 352.43 5171.32 1 4849.74 28.93 378.53 364.20 5003.48 1 4873.96 29.81 421.68 375.29 4855.11 335.76 1 4327.33 30.64 466.07 385.76 4722.82 335.11 1 4303.65 31.43 511.65 395.68 4603.95 335.10 3903.53 32.18 558.35 405.10 4496.47 3351.09 33.57 654.91 422.61 4309.32 3351.09 34.84 755.36 438.60 4151.56 3357.24 3353.23 446.09 4151.56 3451.56 346.09 446.09 <td>7.00</td> <td>7671.83</td> <td>22.15</td> <td>151.01</td> <td>278.90</td> <td>6539.54</td> <td>347.38</td> | 7.00 | 7671.83 | 22.15 | 151.01 | 278.90 | 6539.54 | 347.38 |
| 0 6403.17 24.77 220.14 311.89 5845.84 0 5915.37 25.93 257.42 326.40 5865.15 0 5515.30 26.99 296.31 339.86 5363.17 1 5460.80 27.99 296.31 335.72 352.43 5171.32 1 4849.74 28.93 378.53 364.20 5003.48 1 4573.96 29.81 421.68 375.29 4855.11 2 4327.33 30.64 466.07 385.76 4722.82 3903.53 31.43 511.65 395.68 4603.95 3903.53 32.18 558.35 405.10 496.47 3551.09 33.57 654.91 422.61 4309.32 3355.30 34.84 755.36 430.78 4151.55 3119.08 35.43 806.93 446.09 4151.55 | 8.00 | 6974.38 | 23.52 | 184.62 | 296.15 | 6157.68 | 0 6 |
| 24.27 25.93 257.42 326.40 5585.15 15.30 26.99 296.31 339.86 5363.17 50.80 27.99 336.72 352.43 5171.32 19.74 28.93 378.53 364.20 5003.48 19.74 28.93 375.29 4855.11 17.33 30.64 466.07 385.76 4722.82 15.09 31.43 511.65 395.68 4603.95 3.53 32.18 558.35 405.10 4496.47 3 9.66 32.89 605.12 414.06 4398.70 3 1.09 33.57 654.91 422.61 4309.32 3 2.30 34.84 755.36 438.60 4151.56 3 2.40 35.43 606.93 446.09 4151.56 3 | 9-00 | 6403.17 | 24.17 | 220-14 | 311.89 | 5845.84 | 77-1-0 |
| 5515.30 26.99 296.31 339.86 5363.17 5160.80 27.99 336.72 352.43 5171.32 4849.74 28.93 378.53 364.20 5003.48 4573.96 29.81 421.68 375.29 4855.11 4327.33 30.64 466.07 385.76 4722.82 4105.09 31.43 511.65 395.68 4603.95 3903.53 32.18 558.35 405.10 4496.47 3719.66 32.89 605.12 414.06 4398.70 3351.09 3551.09 33.57 654.91 422.61 4227.24 3486.7 3252.30 34.84 755.36 430.78 4151.56 3351.56 3119.08 35.43 806.93 446.09 4151.56 3351.56 | 00.0 | 5924.27 | 25.93 | 257.42 | 326.40 | 5585.15 | 347.16 |
| 5160.80 27.99 336.72 352.43 5171.32 4849.74 28.93 378.53 364.20 5003.48 4573.96 29.81 421.68 375.29 4855.11 4327.33 30.64 466.07 385.76 4722.82 4105.09 31.43 511.65 395.68 4603.95 3903.53 32.18 558.35 405.10 4496.47 3719.66 32.89 606.12 414.06 4398.70 3551.09 33.57 654.91 422.61 4309.32 3395.85 34.84 755.36 438.60 4151.56 3119.08 35.43 806.93 446.09 4151.56 | 1.00 | 5515.30 | 56.99 | 296.31 | 339.86 | 5363.17 | 11000 |
| 4573.96 29.81 421.68 375.29 4855.11 4327.33 30.64 466.07 385.76 4722.82 4105.09 31.43 511.65 395.68 4603.95 3903.53 32.18 558.35 405.10 4496.47 3719.66 32.89 605.12 414.06 4398.70 3551.09 33.57 654.91 422.61 4309.32 3352.30 34.84 755.36 438.60 4151.56 3 | 2.00 | 5160.80 | 27.99 | 336.72 | 352.43 | 5171.32 | 247.08 |
| 4573.96 29.81 421.68 375.29 4855.11 4327.33 30.64 466.07 385.76 4722.82 4105.09 31.43 511.65 395.68 4603.95 3903.53 32.89 606.12 414.06 4398.70 3551.09 33.57 654.91 422.61 4309.32 3395.85 34.22 704.67 430.78 4227.24 319.08 35.43 806.93 446.09 4081.55 | 3-00 | 4849.14 | 28.93 | 378.53 | 364.20 | 5003.48 | 347.01 |
| 4327.33 30.64 466.07 385.76 4855.11 4105.09 31.43 511.65 395.68 4603.95 3903.53 32.18 558.35 405.10 4496.47 3719.66 32.89 605.12 414.06 4398.70 3551.09 33.57 654.91 422.61 4309.32 3395.85 34.22 704.67 430.78 4227.24 319.08 35.43 806.93 446.09 4081.55 | 00-4 | 4573.96 | 29.81 | 421.48 | | | 15.045 |
| 4105.09 31.43 511.65 395.68 4603.95 3903.53 32.18 558.35 405.10 4496.47 3719.66 32.89 606.12 414.06 4398.70 3551.09 33.57 654.91 422.61 4309.32 3395.85 34.22 704.67 430.78 4227.24 3152.30 34.84 755.36 438.60 4151.56 3119.08 35.43 806.93 446.09 4081.52 | 2.00 | 4327.33 | 77 02 | | 67.616 | 4855-11 | 346.93 |
| 4105-09 31.43 511.65 395.68 4603.95 3903.53 32.18 558.35 405.10 4496.47 3719.66 32.89 606.12 414.06 4398.70 3551.09 33.57 654.91 422.61 4309.32 3395.85 34.22 704.67 430.78 4227.24 3252.30 34.84 755.36 438.60 4151.56 3119.08 35.43 806.93 446.09 4081.57 | | | | 400.01 | 385.76 | 4722.82 | 346.89 |
| 3903.53 32.18 558.35 405.10 4496.47 3719.66 32.89 605.12 414.06 4398.70 3551.09 33.57 654.91 422.61 4309.32 3395.85 34.22 704.67 430.78 4227.24 3252.30 34.84 755.36 438.60 4151.56 3119.08 35.43 806.93 446.09 4081.52 | 000 | 4105.09 | 31.43 | 511.65 | 395.68 | 4603.95 | 4 4 E |
| 3719.66 32.89 605.12 414.06 4398.70 3551.09 33.57 655.91 422.61 4309.32 3395.85 34.22 704.67 430.78 4227.24 3252.30 34.84 755.36 438.60 4151.56 3119.08 35.43 806.93 446.09 4081.52 | 00- | 3903.53 | 32.18 | 558.35 | 405-10 | 4496-47 |) |
| 3551.09 33.57 654.91 422.61 4309.32 3395.85 34.22 704.67 430.78 4227.24 3252.30 34.84 755.36 438.60 4151.56 3119.08 35.43 806.93 446.09 4081.52 | 00 - | 3719.66 | 32.89 | 605.12 | 414.06 | 4398.70 | 7 C C C C C C C C C C C C C C C C C C C |
| 3395.85 34.22 704.67 430.78 4227.24 3252.30 34.84 755.36 438.60 4151.56 3119.08 35.43 806.93 446.09 4081.52 | 00. | | 33.57 | 16.459 | 422.61 | 4309.32 | 346.74 |
| 3252.30 34.84 755.36 438.60 4151.56 3119.08 35.43 806.93 446.09 408.52 | 00- | 3395.85 | 34.22 | 104.67 | 430.78 | 4227.24 | |
| 3119.08 35.43 806.93 446.09 4081.52 | 00- | 3252.30 | 34.84 | 755.36 | 438.60 | 4151.56 | 346.70 |
| | 00. | | 35.43 | 806.93 | 446.09 | 4081 53 | |

| TIME (Sec) | NET T.E. (16s) | SPEED (mph) | DISTANCE | SPRUCKET (rom) | SPROCKET (16-ft each) | SPRUCKET (hp each) | |
|------------|----------------|----------------|----------|-------------------|-----------------------|-----------------------|---|
| 23.00 | 2995.01 | 36.00 | 859.36 | 453.28 | 4016.48 | 346.65 | |
| 24.00 | 2874.20 | 36.55 | 912.61 | 460.18 | 3953.14 | 346.37 | |
| 25.00 | 2761.28 | 37.08 | 966.65 | 466.81 | 3894.10 | 346.11 | |
| 26.00 | 2655.45 | 37.58 | 1021.44 | 473.17 | 3838.90 | 345.86 | |
| 27.00 | 2556.04 | 38.07 | 1076.95 | 479.30 | 3787.19 | 345.62 | |
| 28.00 | 2462.46 | 38.54 | 1133.17 | 485.20 | 3730.62 | 345.39 | |
| 29.00 | 2374-19 | 38.99 | 1190.06 | 490.89 | 3692.92 | 345.16 | , |
| 30.00 | 2290.11 | 39.43 | 1247.59 | 496.37 | 3649.84 | 344.95 | |
| 31.00 | 2211.79 | 39.85 | 1305.76 | 501.66 | 3609.15 | 344.74 | |
| 32.00 | 2136.91 | 40.25 | 1364.53 | 506.77 | 3570.66 | 344.54 | |
| 33.00 | 2065.81 | *9.0* | 1423.88 | 511.71 | 3534.19 | 344.34 | |
| 34.00 | 1998.20 | 41.02 | 1483.80 | 516.49 | 3499.59 | 344.16 | |
| 35.00 | 1933.82 | 41.39 | 1544.27 | 521.11 | 3466.72 | 343.97 | |
| 36.00 | 1872.44 | 41.75 | 1605.26 | 525.59 | 3435.46 | 343.80 | |
| 37.00 | 1813.87 | 42.09 | 1666.77 | 529.92 | 3405.68 | 343.63 | |
| 38.00 | 1157.91 | 42.42 | 1728.77 | 534-12 | 3377-29 | 343.46 | |
| 39.00 | 1704.38 | 42.75 | 1791.25 | 538.19 | 3350.19 | 343,30 | |
| 40.00 | 1653.14 | 43.06 | 1854.20 | 542.13 | 3324.30 | 343.15 | |

| TIME (Sec) | NET T.E. (1bs) | SPEED (mph) | DISTANCE (+t) | SPROCKET (rpm) | SPRUCKET (1b-ft each) | SPRUCKET (hp each) |
|------------|----------------|-------------|------------------|-------------------|-----------------------|-----------------------|
| 41.00 | 1604.04 | 43.36 | 1917.60 | 545.96 | 3299.54 | 343.00 |
| 42.00 | 1556.96 | 43.66 | 1981.44 | 549.68 | 3275.85 | 342.85 |
| 43.00 | 1511.77 | 43.95 | 2045.71 | 553.28 | 3253.15 | 342.71 |
| 44.00 | 1468.36 | 44.22 | 2110.38 | 556.78 | 3231.39 | 342.57 |
| 45.00 | 1426.64 | 64.44 | 2175.47 | 560.19 | 3210.51 | 342.44 |
| 46.00 | 1386.50 | 44.76 | 2240.94 | 563.49 | 3190.46 | 342.31 |
| 46.90 | 1349.65 | 45.00 | 2313-39 | 566.56 | 3172.08 | 342.19 |

| 8 Y : | STATEMENT OF THE STATEM | T: W.E. RODLER R.E.LEMIS RATA INPUT: VEHICLE MEIGHT, 1bs = 80000. VEHICLE MEIGHT, 1bs = 80000. VEHICLE MEIGHT, 1bs = 80000. ROLL NET HP. = 890.0 TRAC OF SPROCKET TEETH = 11 COE L AREA, in. = 68.3 Efficiency data for Homopolar motor given by Gene Seider 20-MY-85 ################################### | OPERATOR: PURPOSE: TRACK P COEFFI MAY-85 ************************************ | OPERATOR: R LEWIS PURPOSE: ELECTRIC DRIVE PROPOSAL ************************************ | ERATOR: R LEWIS URPOSE: ELECTRIC ORIVE PROPOSAL ************************************ | REV. DATE: 33 RUN DATE: 12 second date: 12 MASS INCR. F GRADE: 2 = GRADE: 2 = Kto************************************ | BY: W.E. RODLER R.E.LEWIS R.E.LEWIS PURPOSE:ELECTRIC ORIVE PROPOSAL REV.DATE: 31 MAY 1905 ROBERTATORS LEWIS PORPOSE:ELECTRIC ORIVE PROPOSAL ROBERTATORS LEWIS DATA INPUT: |
|------------------------------------|--|--|---|--|--|--|--|
| | ************************************** | . 1bs = 8000 .h = 45.0 .ETH = 11 68.3 a for Homopol na Selder 20- | AAT-85 ************************************ | COEFICIENT RESISTANCE, ITCH, In. = 7 IENT OF FRIC #CONCEPT I #################################### | OF DRAG = 1.00 1b/ton = 100.0 .63 ITION = 0.70 : TWIN DRIVE HOTC | MASS INCR. F GRADE, \$ = 500 PS | 0.0 |
| **** | TA INPUT: | * 15s = 8000 • 0 | ROLLING TRACK P COEFFI MAY-85 ************************************ | COEFICIENT RESISTANCE TICH, in. = 7 TICH, in | OF DRAG = 1.00 16/con = 100.0 2.63 ITON = 0.70 ITON = 0.70 ITON = 0.70 ITON = 0.70 | MASS INCR. F GRADE, T = GRADE, T = DRS | |
| DA | EHICLE WEIGHT | # 15s = 8000 *0 EETH = 11 68.3 a for Homopol no Selder 20- ************************************ | O. ROLLING TRACK P COEFFI MAY-85 ************************************ | COEFFICIENT RESISTANCE. TICH, 1n. = 7 TICH, | OF DRAG = 1.00 15/ton = 100.0 .63 IION = 0.70 ITION = 0.70 ITION = 0.70 | MASS INCR. F GRADE, T = ORS | |
| AXIMUM AGINE UMBER PONTAL | ENGINE NET MP. × 090.0 NUMBER OF SPROCKET TEETH × 11 FRONTAL AREA, in. × 68.3 | e for Mosobol no Seider 20- | BT MOtor | #CONCEPT I | : TWIN DRIVE MOTO | 28.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3 | |
| <u> </u> | fficiency dat given by Ge | | | SPROCKET | | | TOTANTO TO THE PART OF THE PAR |
| SE ! | RESULTS: | | | SPROCKET | | | |
| TIME (Sec) | NET T.E. | SPEED (mph) | UISTANCE (+t) | | SPROCKET (16-ft each) | SPROCKET (hp each) | |
| 01.0 | 39335.36 | 00.0 | 0.00 | 0.01 | 24103.19 | 90.0 | |
| 0.20 | 51999.87 | 18.0 | 0.13 | 10.92 | 31147.28 | 64-74 | |
| 0.30 | 51999.29 | 2.01 | 0.42 | 25.34 | 31147.28 | 150-25 | |
| 0.40 | 51998.26 | 3.16 | 0.89 | 39.76 | 31147.28 | 235.17 | |
| 0.50 | 48629.70 | 4.30 | 1.52 | 54.17 | 29274.51 | 301.97 | |
| 09-0 | 39115.36 | 5.37 | 2.30 | 67.66 | 23983.62 | 308.97 | |
| 0.10 | 33717.80 | 6.24 | 3.22 | 18.81 | 20982.47 | 313.64 | |
| 0.80 | 30135.19 | 86.98 | 4.24 | 87.86 | 18990.77 | 317.68 | |
| 06.0 | 27522-85 | 1-64 | 5.36 | 96.21 | 17538.72 | 321.29 | |
| 1.00 | 25503.21 | 8.25 | 4.57 | 103.84 | 16416.34 | 324.59 | |
| 2.00 | 15833.50 | 12.69 | 22.52 | 159.75 | 11047.05 | 336.02 | |
| 3.00 | 12109.34 | 15.76 | 43.71 | 198.46 | 8984.16 | 339.49 | |
| 4.00 | 10000 | | | 229.19 | 7821.99 | | |

| TIME (Sec) | NET T.E. (168) | SPEED (mph) | DISTANCE (ft) | SPROCKET (rpm) | SPROCKET (1b-ft each) | SPROCKET (hp each) |
|------------|-------------------|----------------|------------------|-------------------|-----------------------|-----------------------|
| 5.00 | 8565.49 | 20.26 | 97.25 | 255.02 | 7028.78 | 341.30 |
| 00-9 | 7529.85 | 22.03 | 128.42 | 277.41 | 6460.05 | 341.22 |
| 7.00 | 6136.09 | 23.61 | 162.03 | 297.26 | 6025.55 | 341.04 |
| 8.00 | 6103.65 | 25.03 | 197.82 | 315.12 | 5680.48 | 340.83 |
| 9.00 | 5583.48 | 26.32 | 235.58 | 331.37 | 5397.60 | 340.56 |
| 10.00 | 5146.07 | 27.51 | 275.15 | 346.29 | 5160.50 | 340.26 |
| 11.00 | 4771.14 | 28.60 | 316.39 | 360.08 | 4957.93 | 339.92 |
| 12.00 | 4446.47 | 29.62 | 359.16 | 372.90 | 4783.11 | 339.61 |
| 13.00 | 4141.17 | 30.57 | 403.38 | 384.86 | 4629.97 | 339.28 |
| 14.00 | 3907.59 | 31.46 | 46.844 | 396.08 | 4494.30 | 338.94 |
| 15.00 | 3673.79 | 32.30 | 495.16 | 406.62 | 4369.44 | 338.29 |
| 16.00 | 3463.53 | 33.08 | 543.77 | 416.54 | 4257.49 | 337.66 |
| 17.00 | 3273.49 | 33.83 | 592.90 | 425.90 | 4156.62 | 337-07 |
| 18.00 | 3100.72 | 34.53 | 643.08 | 434.76 | 4065.20 | 336.52 |
| 19.00 | 2941.89 | 35.20 | 694.27 | 443.16 | 3981.37 | 335.94 |
| 20.00 | 2795.65 | 35.83 | 146.41 | 451.13 | 3904.40 | 335-37 |
| 21.00 | 2659-13 | 36.43 | 799.45 | 458.71 | 3832.69 | 334.75 |
| 22.00 | 2532,35 | 37.01 | 853.36 | 465.92 | 3766.26 | 336-17 |

| TIME | NET T.E. | SPEED | DISTANCE | SPROCKET | SPROCKET | SPROCKET |
|--------|----------|-------|---|----------|--------------|-----------|
| () es | (1bs) | (Aph) | Cto | (rpm) | (1b-ft each) | (hp each) |
| 23.00 | 2414.85 | 37.55 | 908.08 | 472.79 | 3704.86 | 333.52 |
| 24.00 | 2305.60 | 36.07 | 963.58 | 419.35 | 3647.92 | 332.95 |
| 25.00 | 2208-23 | 38.57 | 1019.82 | 485.62 | 3597.47 | 332.64 |
| 26.00 | 2111.44 | 39.05 | 1076.78 | 491.62 | 3547.23 | 332.04 |
| 27.00 | 2020-83 | 39.50 | 1134.42 | 497.36 | 3500.31 | 331.48 |
| 28-00 | 1935.83 | 39.94 | 1192-71 | 502.86 | 3456.39 | 330.94 |
| 29.00 | 1855.92 | 40.36 | 1251.63 | 508.13 | 3415.21 | 330.42 |
| 30.00 | 1780-18 | 40.16 | 1311.15 | 513.18 | 3376.24 | 329.90 |
| 31.00 | 1708.51 | 41.15 | 1371.25 | 518.02 | 3339.44 | 329.38 |
| 32.00 | 1640.82 | 41.51 | 1431.89 | 522.68 | 3304.76 | 328.89 |
| 33.00 | 1576.79 | 41.87 | 1493.07 | 527.15 | 3272.02 | 328.41 |
| 34.00 | 1516.15 | 42.21 | 1554.75 | 531.44 | 3241.07 | 327.96 |
| 35.00 | 1458.63 | 45.54 | 1616.93 | 535.57 | 3211.78 | 327.52 |
| 36.00 | 1404-02 | 45.85 | 1679.58 | 539.55 | 3184.02 | 327.10 |
| 37.00 | 1352-10 | 43.16 | 1742.68 | 543,38 | 3157.69 | 326.70 |
| 38.00 | 1302.69 | 43.45 | 1806.22 | 547.06 | 3132.67 | 326.31 |
| 39.00 | 1255.62 | 43.73 | 1870.17 | 550.62 | 3108.88 | 325.93 |
| 00.04 | 1210.75 | 10 77 | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | |

| TIME (sec) | NET T.E. | SPEED (mph) | DISTANCE (ft) | SPROCKET (rpm) | SPROCKET (1b-ft each) | SPROCKET (hp each) |
|------------|------------|----------------|------------------|-------------------|-----------------------|-----------------------|
| 11.00 | 1167.92 | 44.27 | 1999.29 | 557.35 | 3064.66 | 325.22 |
| 42.00 | 1 .27 - 02 | 44.52 | 2064.42 | 560.53 | 3044.10 | 324.89 |
| 43.00 | 1087.92 | 11.33 | 2129.92 | 563.61 | 3024.47 | 324.57 |
| 43.90 | 1050.80 | 45.00 | 2202.37 | 566.56 | 3005.86 | 324.26 |

B.2.C Maximum Turn Conditions

The following tables provide drivetrain dat for a vehicle in a turn. These tables are divided into three sections consisting of Title Heading, Data Input and Results. The Title Heading provides in addition to the title, traceability data of program authors, revision data and run date.

The data input section is generally similar to the previous sections except that an input titled "Maximum Acceleration" has been added. This input is the maximum lateral acceleration that the vehicle is to develop in a turn. For this study, a value of 0.5 has been used as representative of aggressive but not reckless driving.

The Results section provides the following data:

- 1. Vehicle speed in 1.5 MPH increments to 45 MPH.
- 2. Lateral acceleration in G's, limited either by available power or by the selected maximum.
- 3. Turn radius in feet measured to the centerline of the vehicle.
- 4. Data for inner and outer sprockets is presented in four columns each as follows:
 - a. Apparent horsepower is the combined power at the sprocket and is the value that would be determined by use of a torque meter and RPM counter.
 - b. Propulsion horsepower is the fraction of the apparent power that is used to propel the vehicle.
 - c. Sprocket RFM with a negative sign indicates reverse rotation.
 - d. Sprocket torque with a negative sign indicates a retarding rather than driving torque.
- 5. Scrub horsepower is the power loss due to scrubbing the tracks around a turn and power flow is always from the vehicle to the tracks.
- 6. Transfer horsepower is the regenerated power that enters the inner sprocket, is transferred by the drive train to the outer sprocket.

| 2 | |
|---|--|
| 4 | |
| 49 | |
| * | |
| * | |
| - | |
| # | |
| * | |
| 2 | |
| 2 | |
| - 4 | |
| # | |
| * | |
| 2 | |
| 34 | |
| 2 | |
| * | |
| # | |
| 4 | |
| X | |
| - | |
| # | |
| * | |
| 2 | |
| 2 | |
| 49 | |
| # | |
| 4 | |
| ä | |
| * | |
| 45 | |
| * | |
| * | |
| 2 | |
| * | |
| # | |
| * | |
| * | |
| * | |
| # | |
| * | |
| * | |
| 4 | |
| - | |
| 49 | |
| * | |
| | |
| 2 | |
| * | |
| * | |
| **** | |
| **** | |
| ****** | |
| ***** | |
| *** | |
| *** | |
| *** | |
| **** | |
| *** | |
| *** | |
| ***** | |
| *** | |
| *** | |
| ************************* | |
| *** | |
| ***** | |
| ****** | |
| ****************** | |
| ******* | |
| ************************ | |
| ************************** | |
| .我们我们的我们的我们的我们的我们的我们的我们的我们的的的 | |
| 2. 李 · 李 · 李 · 李 · · · · · · · · · · · · | |
| 安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安 | |
| 化拉拉拉拉格拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉拉 | |
| (安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安安 | |
| 4 李 李 华 华 安 李 安 李 李 李 李 李 李 李 李 李 李 李 李 李 | |
| 化化化化学 医克格特氏 医克格特氏 医克格特氏 医克格特氏 医克格特氏 医克格特氏 医克格特氏 | |
| 医艾斯特氏氏征 医克拉氏性 医克格氏氏征 医克格特氏征 医拉拉斯氏征 医拉拉斯氏征 医多种性 | |
| 1. 建设备的 医安全的 医安全的 医安全的 医安全的 医安全的 医安全的 医安全的 医安全 | |
| 2、1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1 | |
| 44. 人格尔斯特特特特特特特特特特特特特特特特特特特特特特特特特特特特特特特特特特特 | |
| ************************************* | |
| * | |
| * | |
| * | |
| * | |
| * | |
| * | |
| * | |
| * | |
| * | |
| * | |

| | 3.50¢ 0.500¢ 24.38\$-204.56\$ 26.3\$ 159.0\$-6757.8\$ 438.20\$ 44.8\$270.87\$ 8496.7\$ 81.2¢ 312.1 | RICTION = 0.70 TION, 9s =0.50 A6 = 1.00 *********************************** | 150.79 81.34 81.24 81.25 81.25 81.25 | 5.4* 94.14* 9783.3* 8.5*113.52* 9686.7* 3.6* 83.44* 9308.1* 6.2*160.02* 9260.8* 1.5*191.83* 9204.7* 5.5*216.17* 9098.8* 9.4*239.09* 8980.7* 1.9*253.98* 8750.1* | 175.374 209.374 216.194 282.154 335.194 408.834 423.134 438.204 | 1 1 | | | | | 0.00* 1.50* 4.50* 7.50* 10.50* 13.50* |
|--|--|---|--|--|--|--|--|--|---------|--|---|
| 0.500# 30.10#-232.48# 31.3# 188.5#-6479.0# 452.73# 48.0#289.15# 8223.3# 70.5# | | 334.2 | 10.54 | 8.0#289.15# 8223.3# | 452-134 | | | 4-232.48 | ~ | 0.500 | 15.00# |
| 0.500¢ 24.38*-204.56¢ 26.3¢ 159.0¢-6757.8¢ 438.20¢ 44.8¢270.87¢ 8496.7¢ 81.2¢ | | 286.7 | 94.5# | | 453-13# | | | +-171-14 | - | 0.500 | *00* |
| 0.500# 19.26*-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# 0.500# 24.38#-204.56# 26.3# 159.0#-6757.8# 438.20# 44.8#270.87# 8496.7# 81.2# | 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# | 258.3 | 111.1# | 8980.74 | 408.834 | | | 4-131-496 | - | 0.500 | *05* |
| 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# 0.500# 24.38#-204.56# 26.3# 159.0#-6757.8# 438.20# 44.8#270.87# 8496.7# 81.2# | 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# | 224.7 | 114.34 | | | | | | - | 0.434 | *00* |
| 0.500# 19.26#-171.14# 21.1*6* 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# 0.500# 24.38#-204.56# 26.3# 159.0#-6757.8# 438.20# 44.8#270.87# 8496.7# 81.2# | 0.434# 12.47# -98.82# 11.6# 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# | 189.7 | 115.1# | | 335.19# | | | | - | 0.360 | . 50¢ |
| 0.360# 10.46# -66.93# 7.7# 47.0#-7482.0# 335.19# 31.5#191.83# 9204.7# 115.1# 0.434# 12.47# -98.82# 11.6# 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# 0.500# 24.38#-204.56# 26.3# 159.0#-6757.8# 438.20# 44.8#270.87# 8496.7# 81.2# | 0.360# 10.46# -66.93# 7.7# 47.0#-7482.0# 335.19# 31.5#191.83# 9204.7# 115.1# 0.434# 12.47# -98.82# 11.6# 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# | 152.8 | 103.24 | | | | | | | 0.256 | *00* |
| 0.360# 10.46# -46.55# 5.1# 31.0#-7540.8# 282.15# 26.2#160.02# 9260.8# 103.2# 0.360# 10.46# -66.93# 7.7# 47.0#-7482.0# 335.19# 31.5#191.83# 9204.7# 115.1# 0.434# 12.47# -98.82# 11.6# 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# 0.500# 24.38#-204.56# 26.3# 159.0#-6757.8# 438.20# 44.8#270.87# 8496.7# 81.2# | 0.256# 9.40# -44.55# 5.1# 31.0#-7540.8# 282.15# 26.2#160.02# 9260.8# 103.2# 0.360# 10.46# -66.93# 7.7# 47.0#-7482.0# 335.19# 31.5#191.83# 9204.7# 115.1# 0.434# 12.47# -98.82# 11.6# 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# | 114.9 | 81.3\$ | | | | | | | | .504 |
| 0.151# 8.97# -30.20# 3.4# 21.0#-7564.9# 216.19# 20.0#122.32# 9283.0# 81.3# 0.256# 9.40# -44.55# 5.1# 31.0#-7540.8# 282.15# 26.2#160.02# 9260.8# 103.2# 0.360# 10.46# -66.93# 7.7# 47.0#-7482.0# 335.19# 31.5#191.83# 9204.7# 115.1# 0.434# 12.47# -98.82# 11.6# 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# 0.500# 24.38#-204.56# 26.3# 159.0#-6757.8# 438.20# 44.8#270.87# 8496.7# 81.2# | 0.151# 8.97# -30.20# 3.4# 21.0#-7564.9# 216.19# 20.0#122.32# 9283.0# 81.3# 0.256# 9.40# -44.55# 5.1# 31.0#-7540.8# 282.15# 26.2#160.02# 9260.8# 103.2# 0.360# 10.46# -66.93# 7.7# 47.0#-7482.0# 335.19# 31.5#191.83# 9204.7# 115.1# 0.434# 12.47# -98.82# 11.6# 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# | 76.8 | 57.4# | 3.6# 83.44# 9308.1# | | | | | | 0.0714 | +00 |
| 0.151# 8.49# -17.47# 2.0# 12.1#-7591.5# 147.87# 13.6# 83.44# 9308.1# 57.4# 0.151# 8.97# -30.20# 3.4# 21.0#-7564.9# 216.19# 20.0#122.32# 9283.0# 81.3# 1 0.256# 9.40# -44.55# 5.1# 31.0#-7560.8# 282.15# 26.2#160.02# 9260.8# 103.2# 1 0.360# 10.46# -66.93# 7.7# 47.0#-7482.0# 335.19# 31.5#191.83# 9204.7# 115.1# 1 0.436# 12.47# -98.82# 11.6# 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 2 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 2 0.500# 24.38#-204.56# 26.3# 159.0#-6757.8# 438.20# 44.8#270.87# 8496.7# 81.2# 3 | 0.151# 8.49# -17.47# 2.0# 12.1#-7591.5# 147.87# 13.6# 83.44# 9308.1# 57.4# 0.151# 8.97# -30.20# 3.4# 21.0#-7564.9# 216.19# 20.0#122.32# 9283.0# 81.3# 1 0.256# 9.40# -44.55# 5.1# 31.0#-7560.8# 282.15# 26.2#160.02# 9260.8# 103.2# 1 0.360# 10.46# -66.93# 7.7# 47.0#-7482.0# 335.19# 31.5#191.83# 9204.7# 115.1# 1 0.434# 12.47# -98.82# 11.6# 70.4#-7372.9# 374.50# 35.5#216.17# 9098.8# 114.3# 2 0.500# 14.75#-131.49# 15.7# 95.2#-7251.1# 408.83# 39.4#239.09# 8980.7# 111.1# 2 0.500# 19.26#-171.14# 21.1# 128.1#-7016.1# 423.13# 41.9#253.98# 8750.1# 94.5# 2 | 40.1 | 150.70 | 8.5#113.52# 9686.7# | 209.37 | | | # 121.28# | _ | 0.089 | .504 |
| 0.019\$ 1.69\$ 121.28\$ 10.7\$ -65.8\$-9686.7\$ 209.37\$ 18.5\$113.52\$ 9686.7\$ 150.7\$ 0.017\$ 8.49\$ -17.47\$ 2.0\$ 12.1\$-7591.5\$ 147.87\$ 13.6\$ 83.4\$\$ 9308.1\$ 57.4\$ 0.151\$ 8.97\$ -30.20\$ 3.4\$\$ 21.0\$-7564.9\$ 216.19\$ 20.0\$122.32\$ 9283.0\$ 81.3\$ 10.256\$ 9.40\$ -44.55\$ 5.1\$ 31.0\$-7564.9\$ 216.19\$ 20.0\$122.32\$ 9283.0\$ 81.3\$ 10.256\$ 9.40\$ -46.55\$ 5.1\$ 31.0\$-7540.8\$ 282.15\$ 26.2\$160.02\$ 9260.8\$ 103.2\$ 10.360\$ 10.46\$ -66.93\$ 7.7\$ 47.0\$-7482.0\$ 335.19\$ 31.5\$191.8\$\$ 9204.7\$ 115.1\$ 10.4\$ 12.4\$ 12.4\$ 13.5\$191.8\$\$ 12.47\$ -98.82\$ 11.6\$ 70.4\$-7372.9\$ 374.50\$ 35.5\$216.17\$ 9098.8\$ 114.3\$ 20.5\$00\$ 14.75\$-131.49\$ 15.7\$ 95.2\$-7251.1\$ 408.83\$ 39.4\$239.09\$ 8980.7\$ 111.1\$ 20.5\$00\$ 24.38\$-204.5\$\$ 26.3\$ 15.0\$-6757.8\$ 438.20\$ 44.8\$239.09\$ 8496.7\$ 81.2\$ | 0.0194 1.694 121.284 10.74 -65.84-9686.74 209.374 18.54113.524 9686.74 150.74 0.0114 8.494 -17.474 2.04 12.14-7591.54 147.874 13.64 83.444 9308.14 57.44 0.1514 8.974 -30.204 3.442 21.04-7540.84 216.194 20.04122.324 9283.04 81.34 103.24 10.2564 9.404 -44.554 5.14 31.04-7540.84 282.154 26.24160.024 9260.84 103.24 10.3604 10.464 -66.934 7.74 47.04-7482.04 335.194 31.54191.834 9204.74 115.14 10.434 12.474 -98.824 11.64 70.44-7372.94 374.504 35.54216.174 9098.84 114.34 20.5004 14.754-131.494 12.11 128.14-7016.14 408.834 39.44239.094 8980.74 111.14 20.5004 19.264-171.144 21.14 128.14-7016.14 423.134 41.94253.984 8750.14 94.54 2 | 0.0 | 160.0# | 5.44 94.144 9783.34 | 175.37# | | | | | 0-000 | *00- |
| 0¢ 0.009¢ 1.69¢ 121.20¢ 10.7¢ -65.8¢-966.7¢ 209.37¢ 15.4¢ 94.1¢¢ 9783.3¢ 160.0¢ 40.000¢ 121.20¢ 121.20¢ 10.7¢ -65.8¢-9686.7¢ 209.37¢ 18.5¢113.52¢ 9686.7¢ 150.7¢ 40.010¢ 1.69¢ 1.21.20¢ 12.1¢-7591.5¢ 147.87¢ 13.6¢ 83.4¢¢ 9308.1¢ 57.4¢ 70¢ 0.071¢ 8.49¢ -17.47¢ 2.0¢ 12.1¢-7591.5¢ 147.87¢ 13.6¢ 83.4¢¢ 9308.1¢ 57.4¢ 70¢ 0.151¢ 8.97¢ -30.20¢ 3.4¢ 21.0¢-7564.9¢ 216.19¢ 20.0¢122.32¢ 9283.0¢ 81.3¢ 1110¢ 0.256¢ 9.40¢ -4¢.55¢ 5.1¢ 31.0¢-7540.8¢ 282.15¢ 26.2¢160.02¢ 9260.8¢ 103.2¢ 150¢ 0.256¢ 9.40¢ -66.93¢ 7.7¢ 47.0¢-7482.0¢ 335.19¢ 31.5¢191.83¢ 920¢.7¢ 115.1¢ 180¢ 0.500¢ 14.75¢-131.49¢ 15.7¢ 95.2¢-7251.1¢ 400.83¢ 39.4¢239.09¢ 8980.7¢ 111.1¢ 250¢ 0.500¢ 19.26¢-171.1¢ 21.1¢ 128.1¢-7016.1¢ 423.13¢ 41.9¢253.98¢ 8750.1¢ 94.5¢ 28 31 0.500¢ 24.38¢-204.56¢ 26.3¢ 159.0¢-6757.8¢ 438.20¢ 44.8¢270.87¢ 8496.7¢ 81.2¢ 31 | 0¢ 0.009¢ 1.69¢ 121.28¢ 10.7¢ -65.8¢ -968.7¢ 209.37¢ 15.4¢ 94.1¢¢ 9783.3¢ 160.0¢ 0¢ 0.009¢ 1.69¢ 121.28¢ 10.7¢ -65.8¢ -9686.7¢ 209.37¢ 18.5¢113.52¢ 9686.7¢ 150.7¢ 4 0¢ 0.019¢ 1.69¢ -17.47¢ 2.0¢ 12.1¢ -7591.5¢ 147.87¢ 13.6¢ 83.4¢¢ 9308.1¢ 57.4¢ 7 0¢ 0.151¢ 8.97¢ -17.47¢ 2.0¢ 12.1¢ -7564.9¢ 216.19¢ 20.0¢122.32¢ 9283.0¢ 81.3¢ 11 0¢ 0.256¢ 9.40¢ -4¢.55¢ 5.1¢ 31.0¢ -7560.8¢ 282.15¢ 26.2¢160.02¢ 9260.8¢ 103.2¢ 15 0¢ 0.360¢ 10.46¢ -66.93¢ 7.7¢ 47.0¢ -7482.0¢ 335.19¢ 31.5¢191.83¢ 9206.7¢ 115.1¢ 18 0¢ 0.436¢ 12.47¢ -98.82¢ 11.6¢ 70.4¢ -7372.9¢ 374.50¢ 35.4¢239.09¢ 8980.7¢ 111.1¢ 25 0¢ 0.500¢ 14.75¢ -131.49¢ 15.7¢ 95.2¢ -7251.1¢ 408.83¢ 41.9¢253.98¢ 8750.1¢ 94.5¢ 28 | A M OT TO WE | | | | | | | , | | • |
| ## CESULTS: | RESULTS: | *********** | 25 24 24 24 24 24 24 24 24 24 24 24 24 24 | PROCKET # PROCKET # # RPM #TORQUE # # # Cftlbs)# | # DUTER PRO PRO PRO PRO PRO PRO PRO PRO PRO PR | | IN PROP | A A A A A A A A A A A A A A A A A A A | : - = | ATERAL GOS) | 2 * * |
| ta for Westinghouse induction motor a CONCEPT I: THIN PROPULSION MOTORS # ################################## | | **** | ** | THIN PROPULSION MOTOR *********************************** | tor + CONCEPT I: | nduction so | INKER S | Total And The Control of the Control | | RESULT RESULT RESULT ACCEL (GS) | E 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 |
| | | | | THIN PROPULSION MOTOR *********************************** | tor & CONCEPT I: | aduction so | 1 1 2 2 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | TO T | | Ciency By Cr RESULI | E 6 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 |
| | | 2 0 | 11 OF OR | ton= 100.0 COEFICIEN ************************************ | RESISTANCE-16 per teageteen control of the control | ROLLING ************************************ | 2 | 60.0 60.0 60.0 60.0 60.0 60.0 60.0 60.0 | | TAL ARE C. C. C | FRON E # # # # # # # # # # # # # # # # # # |
| | | • | CCELERA IT OF DR | ton= 100.0 CGFICIEN *********************************** | TCH. 10. m 6.03 F SPROCKET TEETH mest statement of the concept of | TRACK PILING ROLLING Research and uction so seesceese | 2 2 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | 2000.0 6 0.0 6 0.0 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | REGENERAL RESULTION AND COLORS RESULTANT AND COLORS RESULTION AND COLORS RESULTANT AND COLORS | FROST SET SET SET SET SET SET SET SET SET S |
| | 105.5 VEHICLE 105.5 VEHICLE 105.6 VEHICLE 10 | | * 0.0 IN OF F ICCELERA | GRADE, % COEFFICIE MAXIMUM A ton= 100.0 COEFICIEN ************************************ | DIM. in. = 92.5 ICH. in. = 150.0 ICH. in. = 6.03 ICH. in. = 6.03 IF SPROCKET TEFTH = RESISTANCE.1b per *********************************** | TREAD WI TRACK PL TRACK PL NUMBER O ROLLING ************************************ | S.0 S.0 S.0 S.0 S.0 S.0 S.0 S.0 | ### ### #### ######################### | | S VEHIC WE NOT WE NOT WE SEE SEE SEE SEE SEE SEE SEE SEE SEE | GROSI HANSI FRONG |
| | | | * 0.0 INT OF F ICCELERA | GRADE, % COEFFICIE MAXIMUM A 11 ton= 100.0 COEFICIEN seetseetseetseets THIN PROPULSION MOTOR THIN PROPULSION MOTOR SPECKET P # RPM # TORQUE # S P # RPM # TORQUE # | NGTH, in. = 92.5 NGTH, in. = 150.0 TCH, in. = 6.03 FF SPRUCKET TEETH = RESISTANCE, ib Dor spacescontacted tor = CONCEPT I: tor = CONCEPT II to | TREAD MI TRACK LE TRACK PI NUMBER O ROLLING ************************************ | 19.5 10.5 | 6H1. tons 5 50.0 6 0.0 6 0.0 7 10.0 8 10. | | S VEHICE MUN VEL MUN VEL MUN VEL MUN VEL MUN VEL MUN VEN MUN V | GENERAL SERVICE CONTROL CONTRO |
| | | · · · · · · · · · · · · · · · · · · · | ************************************** | CRADE, % COEFFICIE HAXIMUM A ton= 100.0 CUEFICIEN sestestettettettett THIN PROPULSION HOTOR sestestettettettettettettettettettettett | DITH, in. = 92.5 INGTH, in. = 92.5 ICH, in. = 6.03 ICH, in. = | TREAD WI TRACK PL TRACK PL NUMBER POLLING #################################### | 1 NA PROP 2 P P P P P P P P P P P P P P P P P P | 6HT | | S VEHIC NEGROS CIPOLO C | ENGINE SECTIONS SECTI |
| | | **** | * 0.0 NT OF F | GRADE, % COEFFICIE MAXIMUM A 11 ton= 100.0 COEFICIEN seeseeseeseeseeseeseeseeseeseeseeseesee | N DATE: 7-AUG-85:2 ************************************ | TREAD WI TRACK LE TRACK LE TRACK LE TRACK PI MUMBER D ROLLING ************************************ | S. O. | EHT. CONSTRUCTORS | | DATA I DATA I NE GROS ENGINE FALL ARE PACEL I GSS I | # |

19.50¢ 0.500¢ 50.86*-287.01¢ 45.6¢ 271.7¢-5547.7¢ 486.12¢ 58.6¢349.18¢ 7311.9¢ 47.4¢ 380.1

| SPEED & ACCEL (mph) & (gs) | ACCEL #5 | # ACCEL #RADIUS#APPARNT# # (gs) # (ft) # HP # | PPARNTS HP & | PR0P * | * RPM #TORQUE #APPARNT# | APPARNT PR | 0 P # PP# | *TORQUE & | à H | # # # # |
|-------------------------------|----------|--|-----------------|--------|-------------------------------|------------|-----------------------|-----------|-------|------------|
| 21.00# | 0.500* | 0.500# 58.994-296.29# | 296.29# | 50.34 | 298.44-5215.64 492.654 | * 492.65# | 62.5#370.29# 6987.6# | 6987.64 | 41.84 | 388.4 |
| 22.50# | 0.500 | 0.500# 67.72#-301.49# | 301.49# | 55.0# | 55.0* 324.6#-4877.5# | * 496-63# | 66.4#391.77# 6657.8# | 6657.8# | 36.94 | 393.4 |
| 24.00# | 0.500 | 0.500# 77.05#-302.83# | 302.83# | 59.7# | 59.74 350.64-4536.24 498.084 | * 498.08* | 70.4*413.56# | 6325.6# | 32.5# | 395.1 |
| 25.50 | 0.500 | 0.500# 86.98#-300.57# | 300.57# | 64.5# | 64.5# 376.4#-4194.5# 497.07# | 467.07# | 74.64435.59# 5993.4# | 5993.40 | 28.7# | 393.7 |
| 27.00 | 0.5004 | 0.500# 97.51#-294.97# | 294.97 | 47-69 | 69.24 401.94-3855.04 493.72* | * 493.72* | 78.8*457.82\$ | 5663.9# | 25.34 | 389.5 |
| 28.50¢ | 0.500#1 | 0.500#108.65#-286.32# | 286.32# | 74.00 | 74.04 427.24-3519.94 | +88.22¢ | 83.24480.234 | 5339.5* | 22.3# | 382.7 |
| 30.00 | 0.500#1 | 0.5004120.384-274.92# | 274.92# | 78.94 | 78.94 452.44-3191.34 480.784 | 480-78# | 87.64502.79* | 5022.24 | 19.7# | 373.5 |
| 31.50# | 0.500#1 | 0.5004132.724-261.064 | 261.06# | 83.8# | 83.8# 477.5#-2871.3# 471.63# | 471.63# | 92.2#525.47# 4714.0# | 4714.0# | 17.34 | 362.1 |
| 33-00# | 0.50041 | 0.5004145.664-245.064 | 245.068 | 88.7* | 88.7¢ 502.5¢-2561.4¢ 461.04¢ | * 461.04# | 96.8*548.26# 4416.6# | 4416-6# | 15.24 | 349.0 |
| 34.50# | 0.500#1 | 0.5004159.214-227.254 | 227.25# | 93.84 | 93.8# 527.4#-2263.2# 449.26# | * 449.26 | 101.64571.14# 4131.3# | 4131.34 | 13.34 | 334.4 |
| 36.00 | 0.500*1 | 0.500*173.354-207.914 | 207.914 | 98.9* | 98.94 552.24-1977.74 436.57# | 436.57# | 106.4#594.11# | 3859.34 | 11.70 | 318.5 |
| 37.50 | 0.50041 | 0.5004188.104-187.374 | 187.378 | 104-14 | 104.1# 576.9#-1705.9# 423.22# | 423.224 | 111.4*617.15* 3601.7* | 3601.7# | 10.28 | 301.7 |
| 39.00 | 0.500\$2 | 0.500#203.45#-165.89# | 165.894 | 109.4 | 109.4# 601.5#-1448.4# 409.47# | *14.604 | 116.5#640.26# | 3358.94 | 8.94 | 284.2 |
| *05.04 | 0.500#2 | 0.500#219.40#-143.75# | 143.75# | 114.84 | 114.8# 626.1#-1205.8# 395.58# | 395.584 | 121.6*663.42# | 3131.6# | 7.7 | 266.2 |
| 45.00# | 0.500\$2 | 0.500#235.95#-121.20# | 121.20# | 120.3# | 120.34 650.74 -978.34 | 301.75 | 126.9#686.64# | 2920.04 | 6.7 | 248.2 |
| 43.50# | 0.500\$2 | 0.500#253.11# -98.47# | -98.474 | 125.94 | 125.94 675.24 -766.04 368.204 | 368.20# | 132.34709.90# 2724.1# | 2724.1# | 5.84 | 230.1 |
| 45.00* | 0.500#2 | 0.500#270.86# -75.75# | -75.75¢ | 131.6# | 131.6# 699.6# -568.7# 355.12# | 355.124 | 137.94733.204 | 2543.84 | 5.00 | 212.3 |

| THE PROPERTY OF THE PROPERTY O | | | | R.E. LEHIS | LEHIS | REV.OATE: | 13 JUNE | 1985 | | | | | |
|---|--|---|--|--|---|---|-------------------|--|---|---|----------------------------------|--|------------------|
| ### CONTINUES OF THE PRINCE OF | | | | IN N | OATE: 7- | AUG-85;3 | | | | | | | |
| FREED MIDTH, 1D. = 95.5 FRACK PICH. 41. = 6.00 ROLLING RESTSTANCE PERP ton = 100.0 ROLLING RESTSTANCE PERP ton = 100.0 ROLLING RESTSTANCE PERP ton = 100.0 FROM STATEMENT PERP TON = 100.0 FROM STATEMENT PERP TON = 100.0 FROM STATEMENT PERP TON P | estestatestates DATA I | seeceeces | ** | ** | 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | * | ***************** | *** | :# ** ** * * * * * * * * * * * * * * * * | C C C C C C C C C C C C C C C C C C C | ** ** ** ** ** ** | · 64 44 44 44 44 44 44 44 44 44 44 44 44 | 하 참 하 하 |
| ### STAGE CONFIGURATION II ### INCLUSION motor # PRODUCSTER HOTOR SET-UP ### STAGE CONFIGURATION II ### PRODUCSTER HOTOR ### PRODUCSTER HOTOR ### PRODUCSTON HOTOR #\$ ### ### ### PRODUCSTON HOTOR ### ### ### ### ### ### ### ### ### # | GROSS VEHIC MAXIMUN VEL ENSINE GROS LOSS ENGINE FRONTAL ARE STEER MOTOR | LE WEIGHT, t OCITY, mph = S 4P, = 500 S 4P, = 500 A + ft^2 = 9 EFF, % = 9 | tons = 19.5 45.0 17.0 | TREAD WII TRACK LEI TRACK PI NUMBER DI RCLLING STEER SY | 46TH, in. = 4GTH, in. = 1CH, in. | 92.5 = 150.0 6.03 TEETH # 1 E-1b per t TIO = 99: | 1 1 1 100.0 | GRADE. COEFIC MAXIMUM COEFICI PROPUL PROPO. | IENT OF FRICE ACCELERATE OR | CTION = 0. 3N. GS = 0. = 1.00 EFF. X = 94. FIO = 213: | 70 50 8 | 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | 4 |
| PROCKET \$ | Efficiency by Cr | data for Hea | tinghouse in | nduction mo | ** | CONFIGURA PROPULSIO | TION II | OTOR SET | -0.8 | | | | |
| PROCKET # DUTER SPROCKET # CLOF41 # # TORQUE # HP # # TORQUE # HP # RTDRQUE # HP # H | sassassassassassas RESULT | *************************************** | **** | *** | *** | *** | *** | *** | *** | ***** | *** | *** | * |
| PROCKET # PHR NIPPERIOR PROCKET # RPH # TORQUEE HP # RPD WIGHOUS TO BE TOROUGE HP # TORQUEE HP | | 1 | | | | | | | | | | | |
| ###################################### | VEH. # LAT.# SPEED #ACCEL#R (mph) # (gs)# | TURN # RADARA (#1) # HP | INNER SPROCI | KET ** ** *TORQUE ** **(1bft) * | OUTER APARNT#PRO HP * HP | SPROCKET P * RPM #T | TORQUE # | HP & R | PH #TORQUE #(1bft) | # PROPULSI | RPH #TO | #SCRUB RQUE# HP bft)# | HP |
| # 0.1490 | 0-00 4-00004 | 0.004 | ************************************** | .94-9783.34 | 113.54 9 | *6*09 *6* | 9783.14 2 | 46-64 60 | 164.94 213.5 | ******** | 0.34 | 0.04103.5 | 0.0 |
| ## 4 6 6 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 | 1.50 4.07404 | 2.03# 93. | 8.3 | * # # .74-9667.3# | 177.94 16 | * # # | 9496.2# 2 | * 49-56 | 23.7# 209.1 | | | -8.6#125.0 | 1 40.1 |
| ## 2240# 6.04# 6.4# 0.6# -3.6#-9443.5# 254.7# 24.0#16.8# 9108.4# 288.7# 7490.1# 202.5# -4.9# 1510.9# -16.9# # # # # # # 2240# 6.04# 6.4# 0.6# -3.6#-9443.5# 254.7# 24.0#16.8# 9108.4# 288.7# 7490.1# 202.5# -4.9# 1510.9# -16.9# # # # 2240# 6.04# 6.4# 0.6# -3.6#-9443.5# 254.7# 24.0#170.8# 8955.0# 258.2# 7498.4# 180.8# 25.9# 2014.6# 67.6# 64.8# # # # # # # # # # # # # # # # # # # | | | * : | # : | * * | * | *** | | *** | * * | | 4 44134 5 | |
| # \$ 0.04\$ 6.04\$ 0.6\$ -3.6\$ -9.463.5\$ 254.7\$ 24.0\$ 108.4\$ 218.7\$ 7490.1\$ 202.5\$ -4.9\$ 1510.9\$ -16.9\$ 16.0\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | - | | # # # | # - # - # - # - # - # - # - # - # - # - | n7 #1*,17 | # # # | # | # 20.763 | | | | * | |
| # \$ 6.099 # 8.05\$ -29.3\$ 3.3\$ 20.2\$ -7614.0\$ 291.2\$ 28.0\$ 210.2\$ 28.0\$ 170.8\$ 8955.0\$ 258.2\$ 1498.4\$ 180.8\$ 25.9\$ 2014.6\$ 67.6\$ 1 | | | *** | .64-9443.5# # # # | 254.74 | * 04146.84 | 9108.4# 2 | | | | | 16.94122.9 | #117.1 |
| ## 10.08# -63.2\$ 7.3# 4~3\$-7502.4# 326.5\$ 31.9\$194.5\$ 8814.4\$ 253.7# 7483.3# 178.1# 31.7# 2518.2# 66.2#1 ##.4680# 12.09\$ -95.8# 11.2# 68.1#-7393.3# 361.3# 35.9\$218.5# 8686.0# 250.2# 7489.9# 175.5# 37.5# 37.5# 36.2#1 ##.4680# 12.09\$ -95.8# 11.2# 68.1#-7393.3# 361.3# 35.9\$218.5# 8686.0# 250.2# 7489.9# 175.5# 37.5# 37.5# 38.5# ##.5000# 14.74*-131.5# 15.7# 95.2#-7251.3# 388.2# 39.4#239.1# 8527.0# 234.9# 7165.1# 172.2# 43.2# 3525.5# 64.3#1 ##.5000# 19.26*-171.1# 21.1#128.1#-7016.3# 400.2# 41.9#254.0# 8275.9# 199.2# 6269.5# 166.9# 48.7# 4029.1# 63.5# ##.5000# 24.3#-24.6# 26.3# 26.3# 26.0# 26.0# 26.0# 26.0# 27.0# | | | 3.34 | .24-7614.04 | 291.2# 28 | .04170.84 | 8955.0# 2 | *2* | 180 | 25.9* | | .64121 | #154.1 |
| # 4.660 # 12.09¢ -95.8# 11.2# 68.1#-7393.3# 361.3# 35.9#218.5# 8686.0# 250.2# 7489.9# 175.5# 37.5# 31021.9# 65.2# # # # # # # # # # # # # # # # # # # | | | 7.34 | .39-7502.4 | 326.54 | .94194.54 | 8814.44 2 | | | 31.74 | 518.24 | 66.2#119.6 | #190°1 |
| # 5000# 14.74=131.5# 15.24=7251.3# 388.2# 39.44239.1# 8527.0# 234.9# 7165.1# 172.2# 43.2# 3525.5# 64.3#1 # 5000# 19.26=171.1# 21.1#128.1#=7016.3# 400.2# 41.9#254.0# 8275.9# 199.2# 6269.5# 166.9# 48.7# 4029.1# 63.5# # 5000# 19.26=171.1# 21.1#128.1#=7016.3# 400.2# 41.9#254.0# 8275.9# 199.2# 6269.5# 166.9# 48.7# 4029.1# 63.5# # 5000# 19.26=171.1# 21.1#128.1#=7016.3# 400.2# 41.9#254.0# 8275.9# 199.2# 6269.5# 166.9# 48.7# 4029.1# 63.5# # 5000# 24.37#=204.6# 25.3# 50.0#=6779.3# 426.0# 48.0#289.2# 7737.9# 171.0# 572.9# 161.2# 54.6# 653.3# # 5 | - | | * * | .14-7393.3¢ | 361.3# | .9#218.5# | 8686.0# 2 | | | 37.54 | 021.94 | 65.24118.2 | £225-2 |
| # 5000# 19.26#-171.1# 21.1#128.1#-7016.3# 400.2# 41.9#254.0# 8275.9# 199.2# 6269.5# 166.9# 48.7# 4029.1# 63.5# # 4.5000# 19.26#-171.1# 21.1#128.1#-7016.3# 400.2# 41.9#254.0# 8275.9# 199.2# 6269.5# 166.9# 48.7# 4029.1# 63.5# # 5.5000# 24.37#-204.6# 26.3#159.0#-6758.1# 413.3# 44.8#270.9# 8012.9# 171.0# 5572.9# 161.2# 54.6# 4532.8# 63.3# # 5.5000# 30.09#-232.5# 31.3#188.4#-6479.3# 426.0# 48.0#289.2# 7737.9# 148.2# 5015.6# 155.2# 60.9# 5036.4# 63.5# # 5.5000# 36.4#-255.3# 36.1#216.9#-6479.3# 426.0# 48.0#289.2# 7737.9# 148.2# 5559.6# 165.2# 60.9# 5036.4# 63.5# # 5.5000# 43.33#-273.4# 40.9#244.6#-5871.3# 447.7# 55.0#328.5# 7157.3# 113.2# 4179.6# 142.2# 74.6# 6043.7# 64.9# # 5.5000# 43.33#-273.4# 60.9#244.6#-5871.3# 447.7# 55.0#328.5# 7157.3# 113.2# 4179.6# 142.2# 74.6# 6043.7# 64.9# # 5.5000# 50.0# 142.2# 142.2# 142.2# 142.2# 142.2# 74.6# 6043.7# 64.9# # 5.5000# 63.33#-273.4# 60.9#244.6#-5871.3# 44.8# 67.7# 65.0# 67.8# 6 | | # ** | * * | * * ** | | * * * * * | ***** | | | 43 24 | * * * | # | 4259.3 |
| \$\in\$ \text{5.000} \text{19.26} = 171.1\$ 21.1\$ 128.1\$ -7016.3\$ \$\in\$ \text{41.9} \text{5.9} \text{41.9} \text{5.9} \text{41.9} \text{6.9} \text{62.5} \text{66.9} \text{68.7} \text{66.9} \text{68.7} \text{68.7} \text{68.7} \text{68.7} \text{68.7} \text{69.8} | | *************************************** | 13. | \$ \$ \$ | *7.000 | ****** | ******** | | | | # 0 * 0 7 6 | # | |
| # 5000# 24.37#-204.6\$ 26.3#159.0#-6758.1\$ 413.3# 44.8#270.9\$ 8012.8\$ 171.0\$ 5572.9\$ 161.2\$ 54.6\$ 4532.8\$ 63.3# 4 63.3 4 64.8#270.9\$ 8012.8\$ 171.0\$ 5572.9\$ 161.2\$ 54.6\$ 4532.8\$ 63.3 4 6 | | 19.264-171. | 21.1 | .1#-7016.34 | 400.2# | .9#254.0# | 8275.9# 1 | | | 48.7# | 029.1# | | #286.8 |
| # # # # # # # # # # # # # # # # # # # | | | | .04-6758.14 | 413.34 | .8#270.9# | 8012.84 1 | 171.0# 5 | 572.94 161.2 | 54.64 | 532.84 | 63.3# 81.3 | #312.1 |
| # # # # # # # # # # # # # # # # # # # | | | | * **-6479.3* | 426.0# 48 | * 04289.2* | 1737.94 1 | 48.24 50 | 115.64 155.2 | \$6.09 | ***** | 63.5# 70.5 | ¢334.3 |
| \$\psi_5000\psi_56.4\psi_255.3\psi_36.1\psi_216.9\psi_64.3\psi_7\psi_51.4\psi_30\psi_64.129.2\psi_6559.6\psi_148.8\psi_67.6\psi_64.5\psi_64.1\psi_64.9\psi_64.6\psi_64.5\psi_64.5\psi_64.5\psi_64.5\psi_64.6\psi_64.5\psi_64.6\psi_64.5\psi_64.6\psi_64.5\psi_64.6\psi_64.5\psi_64.6\psi_64.5\psi_64.6\psi_64.5\psi_64.6\psi_64.5\psi_64.6\psi_64.6\psi_64.6\psi_64.6\psi_64.6\psi_64.6\psi_64.9\psi_64.6\psi_64 | | | | 4 | * | 4 | * | # | # | • | | | 4 |
| \$5000# \$3.33#-273.4# \$0.9#2\$4.6#-5871.3# \$47.7# \$5.0#328.5# 7157.3# 113.2# \$179.6# 142.2# 74.6# \$043.7# \$4.9# \$3 # # # # # # # # # # # # # # # # # # # | | 36.414-255 | 36-1 | .94-6182.74 4 * | 437.7# | 44308.54 | 7452.2# 1 | | | ¢7.6# | | | #353 . 0 |
| \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | | | *** 40.9#244 | .64-5871.34 | 447.74 | .04328.54 | 7157.34 1 | 113.24 41 | 179.64 142.2 | 74.6# | 043.74 | 64.9# 53.9 | #368 - 3 |
| | * * 05.00 | | | 72-5568-18 | 455.84 | \$ \$ \$ \$ | 4855.04 | # 9-66 | # 158,1# 135.4 | | E 47.30 | 45.94 47.4 | ¢380.1 |

| EH. & LAT.4 (EED &ACCEL6 ob) & (05)* | VEH. # LAT.# TURN # INNER SPRO SPEED #ACCEL#?ADIUS #APARNT#PROP # R (moh) # (gs)# (ft) # HP # HP # | ROCKET & RPM &TORQUE &: #CIbf+) & | DCKET & DUTER SPROCKET RPM &TORQUE RPM &TORQUE APPARNTAPROP & RPM &TORQUE &TORQUE & TORQUE & | CKET ** | HP * | STEER MOTOR & A RPM &TORQUE& | 9UE# | # PROPULSION MOTOR IE& HP # RPM #TOROU | | #SCRUBATRANS E# HP # HP |
|--|--|---|---|--------------|---------------|------------------------------|--------|--|---------|----------------------------|
| *** | 可可要的事情,更是这种的,我们也是一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个一个 | ********* | ************ | *********** | **** | ***** | ***** | 1.在存在存在存在存在存在存在 | ******* | *********** |
| *0005** 00* | 21.00 4.50004 58.984-296.34 50.34298.44-5216.04 461.64 62.54370.34 6547.34 | 8.44-5216.04 | 461.6# 62.5#37 | 0.34 6547.34 | 87.6# 3 | 87.64 3582.64 128.44 | 8.44 | 90.2# 7051.0# | 1 67.2# | 67.2# 41.8#388.4 |
| * | * * | * | * | # | | ø | * | * | | * |
| .50 4.50004 | 22.50 #.5000# 67.70#-301.5# 55.0#324.6#-4878.0# 465.2# 66.4#391.8# 6236.4# | 4.64-6878.04 | 465.2# 66.4#39 | 1.8# 6236.4# | | 1343.74 121 | 1 · 3# | 77.2# 3343.7# 121.3# 98.6# 7554.6# | | 68.54 36.94393.4 |
| * | * | # | * | * | * | * | # | 4 | | * |
| *000 ** 2000 | 24.00 *.5000\$ 77.03#-302.9# 59.7#350.6#-4536.8# 466.5# 70.4#413.6# 5924.6# | 0.64-4536.84 | 1949.01 #5.999 | 3.64 5924.64 | 68.1# 3 | 1134.72 114 | 6.24 1 | 68.1# 3134.7# 114.2# 107.4# 8058.3# | | 70.04 32.54395.1 |
| * | 4 | * | * | # | | * | * | # | * | # |
| *20 4 * 20004 | Z5.5U #.5000# 86.96#-300.6# 64.5#376.3#-4195.1# 465.6# 74.6#435.6# 5614.1# | 6.34-4195.14 | 465.64 74.6443 | 5.64 5614.1# | | 101 #6.056 | 7.14 1 | 60.1# 2950.3# 107.1# 116.7# 8561.9# | | 71.64 28.74393.8 |
| * | * | * | * | # | | # | # | # | | * |
| *000 4 * 2000 | 91.494-295.04 69.2440 | 1.94-3855.6* | 462.64 78.8445 | 1.84 5307.0# | 53.1# 2 | 786.4# 100 | 0.00 | 53.1# 2786.4# 100.0# 126.4# 9065.6# | | 73.24 25.44389.6 |
| # | *** | * | # | # | # | * | # | * | | * |
| .50 #.5000# | 108-624-286-4# 74-0#42 | 7.24-3520.54 | 457.7# 83.2#4B(| 1.24 5005.3¢ | | 639.8# 95 | 3.0¢ 1 | 46.8# 2639.8# 93.0# 136.5# 9569.2# | | 74.9# 22.4#382.7 |
| # | * | 4 | 4 | # | | * | * | * | | * |
| *000 4. 5000# | 120.364-275.04 78.9445 | 2.44-3192.04 | 451.04 87.6450; | 2.84 4710.7¢ | 41.2# 2507.8# | | 5.2# 1 | 86.2# 146.9#10072.8# | | 76.64 19.74373.5 |
| * | * | # | * | # | | | * | 4 | | # |
| .50 *.5000# | 132.704-261.1# 83.8#47 | 7.54-2872.04 | 442.7# 92.2#52 | 5.5# 4425.1# | 36.2# 2388.4# | | 9.6# I | 79.6# 157.8#10576.5# | | 78.34 17.34362.2 |
| * | * | # | # | * | | | * | • | | * |
| ** 2000 | 33.00 4.5000¢ 145.63¢-245.1* 88.7¢502.5¢-2562.1¢ 433.2¢ 96.8¢548.3¢ 4149.7¢ | 2.54-2562.14 | 433.2# 96.8#54 | 3.3¢ 4149.7¢ | 31.8# 2279.8# | | 3.2# 1 | 73.2# 168.9#11080.1# | | 80.1# 15.2#349.1 |
| | | # | * | # | | | # | * | * | * |
| .50 # .5000# | 34.50 \$.5000\$ 159.18\$-227.3\$ 93.8\$527.4\$-2263.8\$ 422.6\$101.6\$571.1\$ 3885.9\$ | 1.44-2263.84 | 422.6#101.6#57] | .14 3885.94 | 27.9# 2180.7# | | 1.14 1 | 67.14 180.5411583.84 | | 81.84 13.34334.4 |
| | ** | 4 | # | * | * | | # | * | * | * |
| -00 # - 5000¢ | 36.00 \$.5000\$ 173.324-208.0\$ 98.9\$552.2\$-1978.3\$ 411.2\$106.4\$594.1\$ 3634.7\$ | 2.24-1978.34 | 411.24106.44594 | 1-1# 3634.7# | 24.4# 2089.8# | | 1.3# 1 | 61.3# 192.3#12087.4# | | 83.6# 11.7#318.6 |
| | * | * | # | * | # | | * | * | | # |
| *20 4 * 2000# | 3/.5U #.5000# 188.06#~187.4#104.1#576.9#~1706.5# 399.2#111.4#617.2# 3396.9# | 6.94-1706.54 | 399.24111.4461 | 1.2# 3396.9# | 21.34 2006.24 | | 5.74 2 | 55.7# 204.4#12591.0# | | 85.34 10.24301.7 |
| | * | * | * | # | # | | 4 | * | | * |
| *000 \$ * 2000 | 39.00 #.5000# 203.41#~166.0#109.4#501.5#-1449.0# 386.8#116.5#640.3# 3173.0# | 1.54-1449.04 | 386.84116.54641 | 1.34 3173.04 | 18.54 1929.14 | | 3.44 2 | 50.4# 216.8#13094.7# | 87.04 | 8.94294.2 |
| | | # | * | * | * | | * | # | # | * |
| - 50 # - 5000# | 40.50 #.5000# 219.35#-143.8#114.8#626.1#-1206.4# 374.4#121.6#663.4# 2963.6# | 6.14-1206.44 | 374.44121.6466 | 1.4# 2963.6# | 16.1# 1857.6# | | 5.5# 2 | 45.5# 229.5#13598.3# | 88.64 | 7.7#266.3 |
| | * | * | * | * | | # | # | # | * | * |
| *000 \$ * 2000\$ | 42.00 \$.5000\$ 235.90\$-121.3\$120.3\$650.7\$ -978.9\$ 362.0\$126.9\$686.6\$ 2768.7\$ | 0.74 -978.94 | 362.04126.94684 | 1.6# 2768.7# | 13.94 1791.34 | | 1.94 2 | 40.94 242.4414102.04 | *8 06 : | 6.7#248.2 |
| | | # | * | * | | | # | * | 4 | * |
| *20005 ** 06. | 43.5U #.5UUU# 253.U6# -98.5#125.9#675.2# -766.5# 349.9#132.3#709.9# 2588.5# | 2.54 -766.54 | 349.9#132.3#709 | 1.94 2588.54 | 12.14 1729.54 | | 2 #9 . | 36.64 255.6414605.64 | 91.94 | 5.84230.2 |
| * | * | # | * | # | * | | # | * | • | • |
| *000 \$ * 2000\$ | 45.00 %.5000% 270.81% -75.8%131.6%699.6% -569.2% 338.2%137.9%733.2% 2422.7% 10.4% 1671.9% | 9.64 269.54 | 338,24137,94733 | 1.24 2422.74 | 10.4# 1 | | .74 2 | 32.74 269.0415109.34 | 93.54 | 5.04212.4 |
| * | * | * | 4 | # | 4 | | Ħ | 4 | | |

| 45 | |
|------|--|
| # | |
| 44 | |
| # | |
| 44 | |
| * | |
| ü | |
| * | |
| 4 | |
| * | |
| # | |
| * | |
| - 17 | |
| * | |
| * | |
| * | |
| | |
| 4 | |
| 8 | |
| # | |
| # | |
| 45 | |
| * | |
| * | |
| * | |
| 4 | |
| * | |
| 4 | |
| 8 | |
| # | |
| * | |
| * | |
| * | |
| # | |
| # | |
| # | |
| # | |
| 49 | |
| ä | |
| # | |
| * | |
| • | |
| # | |
| ĕ | |
| * | |
| 8 | |
| * | |
| * | |
| # | |
| 4 | |
| # | |
| 45 | |
| * | |
| # | |
| # | |
| * | |
| * | |
| - | |
| 44 | |
| * | |
| # | |
| 45 | |
| 2 | |
| | |
| * | |
| # | |
| * | |
| * | |
| 44 | |
| # | |
| 4 | |
| * | |
| 2 | |
| - | |
| 4 | |
| ä | |
| | |
| * | |
| 4 | |
| 8 | |
| * | |
| 44 | |

| | ** ** | SPROCKET W.E. RODLER L.M. FERNANDEZ | ET HORSEPOWER REV.DATE: | OWER DATE: 14 MAY 1985 | | |
|---|-----------------------|---|----------------------------|---|-------------------------|---|
| | | RUN DATE: | : 7-AUG-85:1 | 5:1 | | |
| ************************************** | | | | 都与你表现在交通的设备的,我们是有一个,我们就是有一个,我们就是有一个,我们就是一个,我们就是一个,我们就是一个,我们就是我们的,我们就是我们的,我们就是这个的 【】: | | · · · · · · · · · · · · · · · · · · · |
| | | | | | | |
| S ACC - THETEN A LODGE T | 19.5 | TREAD WIDTH. | in. = 92.5 | | 0-0 = 3 | |
| ITY, mph = 45 | | LENGTH | Ħ | 0 | COEFFICIENT OF FRICTION | |
| H | | | | | MAXIMUM ACCELERATION. | 56 |
| LOSS ENGINE HP. * 60.0 FRONTAL AREA, in. * 57.0 | | NUMBER OF SPROCKET TER | SPROCKET TEETH | * 11 r ton= 100.0 | COEFICIENT OF DR | DRAG = 1.00 |
| 存在各种条件的,是有有的,是有的,是有的,是有的,是有的,是有的,是有的,是有的,是有的的,是有的的,是有的,是有 | **** | **** | **** | ************* | **** | **** |
| Efficiency data for Homopolar mot given by Gene Seider 20-MAY-85 | PPOLAT 20-MAY | motor # CE | CONCEPT I: | THIN PROPULSION MOTORS | | |
| 检查表现的专作的专作的专作的专作的专用的专用的专用的专作的专作的专作的专作的专作的专作的专作的专作的专作的专作的专作的专作的专作的 | * * * * * | ******************** | ** | · 计通信 医乳状性 医乳状性 医乳状性 医乳状性 医乳状性 医乳状性 医乳状性 医乳状性 | | |
| | | | | | | |
| *LATERAL* TURN * TACEL *RADIUS*APPARNT* | | SPROCKET # 0U" * RPH *TORQUE #APPARNT* | PPARNT# P | SPROCKET ROP * RPM #10RQUE | SCRUB | #TRANSFR# |
| (aph) # (gs) # (ft) # HP # | # 4 | #(ft1bs)# | # GI | HP # #(ft1bs)# | * | # |
| 0.00* 0.000* 0.00\$ 165.50* | 14.5# | -88.84-9783.34 | 165.564 | 14.54 88.88# 9783.3# | 151.0# | 0.0 |
| 1.504 0.0844 1.784 112.504 | 10.0 | -61.0*-9681.4 | 200.54# | 17.84108.794 9681.44 | 145.6# | 40.1 |
| 3.00# 0.070 8.62# -18.21# | 2.1# | 12.64-7584.74 | 146.84 | 13.54 82.914 9301.34 | \$6.54 | 76.8 |
| 4.50¢ 0.149¢ 9.09¢ -31.11¢ | 3.5# | 21.64-7558.64 | 214.90 | 19.94121.674 9276.74 | * 80.2* | 114.8 |
| 6.004 0.2534 9.504 -45.534 | 5.2# | 31.74-7535.14 280.734 | 280-73# | 26-1#159.31# 9255.2# | 102.04 | 152.7 |
| 7.50# 0.340# 11.06# -72.24# | 8.44 | \$0.94-7449.74 | 328.12# | 30.84187.884 9172.34 | 108.4# | 188.9 |
| 9.00# 0.403# 13.45#-105.50# | 12.44 | 75.7*-7321.2* | 363.26# | 34.6#210.88# 9047.1# | 105.34 | 223.3 |
| 10.50# 0.453# 16.26#-139.22# | 16.8# | 102.04-7172.14 | 393.85# | 38.3#232.38# 8901.7# | *8.66 | 255.8 |
| 12.00* 0.500* 19.26#-171.14# | 21.1\$ | 128.1#-7016.19 | 453.13# | 41.9#253.98# 8750.1# | \$5.96 | 286.7 |
| 13.50# 0.500# 24.38#-204.56# | 26.3# | 159.04-6757.84 | 438,204 | 44.8#270.87# 8496.7# | 81.2# | 312.1 |
| 15.00# 0.500# 30.10#-232.48# | 31.3# | 188.5*-6479.0* | 452-73# | 48.0#289.15# 8223.3# | ¥ 70.54 | 334.2 |
| 16.50# 0.500# 36.42#-255.34# | 36.1# | 216.9#-6182.4# | 468.89# | 51.44308.464 7932.74 | 61.54 | 353.0 |
| 18.00# 0.500# 43.34#-273.43# | 46.04 | 244.64-5870.94 | 411-14# | 55.04328.524 7628.04 | \$ 53.94 | 368.3 |
| 19.504 0.5004 50.864-287.014 | 49.54 | 45.6# 271.7#-5547.7# | 486.120 | 58.64349.184 7311.94 | 44.74 | 380.1 |
| | | | | | | |

| 40 | # ACCEL # | # ACCEL #RADIUS# | APPARNT H | PROP | * RPM #TORQUE # | APPARN | ## PROP # RPK | *TORQUE * | HP ## | SEKUB SEKANSEKS HP & HP * |
|----|-----------|------------------|-----------------------|------|---------------------------------|-------------|-----------------------|------------|--------|------------------------------|
| 0 | *200\$ | 58.994 | 0.500* 58.99*-296.29 | | 50.3# 298.4#-5215.6# 492.65# | # 492.65# | 62.5#370.29# 6987.6# | * 6987.6* | 41.84 | 388.4 |
| 0 | .500 | 67-72# | 0.500# 67.72#-301.49# | | 55.0# 324.6#-4877.5# 496.63# | # 496.63# | 66.4#391.77# 6657.8# | * 6657.8 | 36.94 | 393.4 |
| 0 | .500* | 77.054 | 0.500* 77.054-302.83# | | 59.74 350.64-4536.24 498.08# | \$ 498°08¢ | 70.44413.56# 6325.6# | 6325.64 | 32.54 | 395.1 |
| 0 | .500 | 86.98 | 0.500# 86.98#-300.57# | | 64.54 376.44-4194.54 497.074 | \$ 497.07\$ | 74.64435.59# 5993.4# | \$ 5993.4# | 28.7# | 393.7 |
| 0 | .500 | 97.51# | 0.5004 97.514-294.974 | | 69.2# 401.9#-3855.0# 493.72# | # 493.72# | 78.8*457.82# 5663.9# | \$6.6995 | 25.34 | 389.5 |
| 0 | *005 | 108.65 | 0.500#108.65#-286.32# | | 74.0\$ 427.24-3519.9\$ 488.22\$ | # 488.22# | 83.24480.234 5339.54 | \$339.54 | 22.3# | 382.7 |
| - | .5004 | 120.38 | 0.500#120.38#-274.92# | | 78.94 452.44-3191.34 480.784 | 480-784 | 87.6#502.79# 5022.2# | \$5.22.24 | 19.74 | 373.5 |
| 0 | -5004 | 132-72# | 0.500#132.72#-261.06# | | 83.84 477.54-2871.34 471.634 | # 471.63# | 92.2#525.47# 4714.0# | 4114-0* | 17.3# | 362.1 |
| 0 | +005. | 145.66# | 0.500#145.66#-245.06# | | 88.74 502.54-2561.44 461.044 | # 461-049 | 96.84548.264 4416.6* | *4416.6* | 15.24 | 349.0 |
| 0 | *200\$ | 159.21 | 0.500#159.21#-227.25# | | 93.84 527.44-2263.24 449.264 | * 449.26 | 101.64571.14# 4131.3# | 4131.34 | 13.3\$ | 334.4 |
| _ | *005 | 173.35# | 0.500#173.35#-207.91# | | 98.94 552.24-1977.74 436.574 | # 436.57¢ | 106.44594.114 3859.34 | 3859.34 | 11.70 | 318.5 |
| 0 | -500# | 188.104 | 0.500#188.10#-187.37# | | 104.1# 576.9#-1705.9# 423.22# | # 423.22# | 111.4*617.15# 3601.7# | 3601.7# | 10.2# | 301:7 |
| 0 | *005 | 203.45# | 0.500#203.45#-165.89# | | 109.4# 601.5#-1448.4# 409.47# | * 409.47 | 116.5#640.26# 3358.9# | 3356.94 | 8.94 | 284.2 |
| 0 | .4864 | 225.46# | 0.486#225.46#-133.95# | | 114.9# 626.6#-1122.7# 384.79# | # 384.79# | 121.54662.92# 3048.6# | 3048.6# | 7.24 | 256.0 |
| • | *591. | 253.66# | 0.465#253.66# -95.32# | | 120.5¢ 651.9¢ -767.9¢ 353.60¢ | 4 353.50\$ | 126.74685.38# 2709.6# | ₹5.6012 | 5.54 | 221.4 |
| • | .442# | 286.56 | 0.442#286.56# -55.11# | | 126.2# 677.2# -427.4# 321.52# | # 321.52# | 132.04707.874 2385.54 | 2385.54 | 4.10 | 185.5 |
| 0 | .415* | 326.13# | 0.415#326.13# -13.66# | | 132.1# 702.5# -102.1# 288.87# | # 288.87# | 137.34730.364 2077.34 | 2077.34 | 2.94 | 2.9# 148.6 |

| **** | |
|--------------------|-------------------------|
| *** | 14 MAY 1985 |
| *** | HORSEPOWER REV.DATE: |
| *** | SPROCKET . RODLER |
| **** | BY: W.E |
| ****************** | |

GRADE, % = 0.0 COEFFICIENT OF FRICTION = 0.70 MAXIMUM ACCELERATION, 95 =0.50 COEFICIENT OF DRAG . 1.00 ROLLING RESISTANCE, 1b per ton= 100.0 TREAD WIDTH, in. = 109.8
TRACK LENGTH, in. = 183.1
TRACK PITCH, in. = 7.63
NUMBER OF SPROCKET TEETH = 11 RUN DATE: 15-AUG-85:115 40.0 GROSS VEHICLE WEIGHT, tons = MAXIMUM VELOCITY, mph = 45.0 ENGINE GROSS HP. *1000.0 LOSS ENGINE HP. * 120.0 FRONTAL AREA, in. = 68.3 DATA INPUT:

RESULTS:

VEH øLATERALØTURN & INNER SPROCKET & DUTER SPROCKET & SCRUB #TRANSFR# Speed & ACCEL #RADIUS#APPARNT& PROP & RPH #TGRQUE #APPARNT& PROP # RPM #TDRQUE # HP # HP # (mph) # (gs) # (ft) # HP # HP # #(ftlbs)* HP # HP # #(ftlbs)# # # 768.4 83.5 793.0 0.1 8.649 4.169 158.4 459.3 121.84282.86419225.74 120.64 137.24 220.54 211.4# 203.44 179.3# 156.5# 319.1# 228.64 227.04 298.4* 117.7# 166.2# 210.84 114.74267.08420063.64 101.64237.41#21641.4# 108.04251.88420871.44 95.34223.17422321.74 79.94187.60423141.04 53.5#126.19#24088.2# 63.74149.93423862.54 72.04169.31423519.94 87.54205.27422729.14 30.24 71.18#25773.3# 36.64 86.38#25447.3# 27.94 65.83424245.04 40.9# 96.45424160.9# 60.0# 140.3#-17148.# 978.23# 89.64 208.24-14702.41035.424 70.1# 163.6#-16369.#1000.94# 80.04 186.24-15551.41020.294 41.3# 96.9#-18251.# 888.32# 49.94 116.84-17837.# 948.50# 30.14 -71.24-25773.4 349.314 9.74-19794.4 303.904 16.94-19707.4 443.714 24.94-19621.4 578.740 38.94-19402.4 681.194 57.34-19054.4 758.194 76.84-18670.4 826.564 20.64 -48.64-25447.4 418.504 4.1* 7.14 32.74 16.5# 24.44 10.6# 0.5000 50.864-582.704 0.4464 21.574-336.724 0.5004 36.424-509.884 0.500# 43.34#-551.21# 0.123# 11.01# -63.25# 0.209# 11.54# -93.05# 0.286# 13.16#-143.79# 0.346# 15.66#-207.94# 0.3994 18.464-273.004 0.493# 24.72#-396.53# 0.500# 30.10#-458.07# \$61.64E \$0.000 \$0.00 349.19# 0.069# 2.17# 235.50# 0.0584 10.414 -36.584 18.00* 19.500 1.50# 3.004 4.50¢ 10.504 13.50# 15.00# \$00°9 1.50# \$ 00 · 6 12.00# 16.50#

| SPEED # | # ACCEL # | # ACCEL #RADIUS#APPARNT# # (gs) # (ft) # HP # | PARNTE HP # | PROP * | ** | eTORQUE #4 | #TORQUE #APPARNT# PI | PROP # RPM | * *TORQUE * *(ftibs)* | HP | # # # # # # # # # # # # # # # # # # # |
|---------|-----------|--|----------------|--------|---------------|-------------------------------|------------------------|-----------------------|-----------------------|---------|---------------------------------------|
| 21.00 | 0.500 | 0.5004 58.994-604.904 | *06**0 | 99.2* | 229.7#- | -13830.#1 | 229.7#-13830.#1045.80# | 129.1#299.07#18365.60 | 7#18365.6 | 106.34 | 4 810.4 |
| 22.50# | \$005-0 | 67.72#-618.33# | 18.33# | 108.64 | 250.94- | 250.94-12943.41051.194 | 461.1501 | 136.7#315.65#17490.9# | 5#17490.94 | 93.84 | 1 820.7 |
| 24.00# | 0.500 | 0.500# 77.05#-623.52# | 23.52# | 118.0 | 271.84- | -12048.4 | 271.84-12048.41051.534 | 144.4#332.51#16609.2# | 1#16609.24 | 85.84 | 824.3 |
| 25.50# | 0.500 | 0.500# 86.98#-621.03# | 21.03# | 127.4# | 292.54- | 127.4# 292.5#-11152.#1046.92# | 1046.92# | 152.3#349.61#15727.5# | 1#15727.54 | 13.1\$ | 821.5 |
| 27.00# | 0.500 | 0.500# 97.51#-611.45# | 11.45# | 136.8# | 313.0#- | 313.0#-10261.#1037.59# | 1037.59# | 160.4#366.91#14852.6# | 1#14852.64 | 64.54 | 812.7 |
| 28.50 | *005*0 | 0.500#108.65#-595.40# | \$09.56 | 146.2# | 333.34 | 333.34 -9383.41023.904 | 1023.90# | 168.64344.37413990.64 | 7413990.64 | \$6.9\$ | 7.86.4 |
| 30.00# | 0.500 | 0.5004120.384-573.524 | 13.52# | 155.6# | 353.44 | 353.4# -8523.#1006.25# | 1006.25# | 177.0*401.98013147.3* | 8¢13147.34 | 50.10 | 179.2 |
| 31.50# | \$005*0 | 0.500#132.72#-546.48# | 48.94 | 165.1# | 373.54 | 165.1# 373.5# -7685.# 385.12# | 385.12# | 185.54419.71#12327.5# | 1#12327.54 | 46.00 | 155.6 |
| 33.00¢ | 0.500 | 0.5004145.664-514.94# | 14.94 | 174.6# | 393.44 | 174.6# 393.4# -6875.# 961.03# | 961.034 | 194.24437.54411535.74 | 4411535.74 | 38.74 | 728.2 |
| 34.504 | 0.500 | 0.5004159.214-479.57# | 19.57# | 184.24 | 184.2# 413.3# | | -6095.# 934.49# | 203.04455.47410775.84 | 7810775.84 | 33.9# | 697.6 |
| 36.00* | 0.500 | 0.5004173.354-441.034 | 41.03# | 193.84 | 193.8# 433.0# | -5349.# 906.07# | \$10.906 | 211.94473.48#10050.7# | 8#10050.7# | 29.74 | 664.5 |
| 37.50# | 0.500 | 0.500#188.10#-399.96# | #96.66 | 203.54 | 203.54 452.74 | -4640.# 876.29# | 876.29# | 221.0#491.55# 9362.9# | 5# 9362.9# | 25.94 | 629.4 |
| 39.00 | 0.500 | 0.500#203.45#-356.96# | \$96.95 | 213.4# | 213.4# 472.3# | -3969.# 845.67# | 845.67 | 230.2#509.694 | 90 8714.24 | 22.5# | 592.9 |
| +05.04 | 0.5004 | 0.5004219.404-312.624 | 12.62# | 223,34 | 223.34 491.94 | -3338.# 814.72# | 814.72\$ | 239.64527.884 | 8¢ 8105.9¢ | 19.64 | 5555.5 |
| 45.00# | 0.5004 | 0.5004235.95*-267.45* | 67.45# | 233.34 | 233.3# 511.4# | -2746.4 783.894 | 783.894 | 249.2#546.13# 7538.7# | 3# 7538.7# | 17.0\$ | 517.8 |
| 43.50# | 0.500 | 0.500#253.11#-221.94# | 21.94# | 243.54 | 243.54 530.94 | -2195.# 753.60# | 753.60# | 258.8#564.41# 7012.6# | 1# 7012.6# | 14.78 | 480.1 |
| \$00°59 | 0.500# | 0.5004200.864-176.524 | 76.52# | 253.74 | 253.74 550.44 | -1684.4 724.248 | 724.24 | 268.7#582.74# 6527.4# | 14 6527.48 | 12.7# | 442.9 |

| | · 《《《《《》》《《《》》《《《》》《《》》《《《》》《《》》《《》》《《》》 | PUN DATE: 1 | | | |
|--|--|--|--|--|--|
| | *** | | RUN DATE: 15-AUG-85:116 | | |
| ************************************** | NPUT: | *** | ************* | ************************* | |
| GROSS VEHICLE MEIGHT, MAXIMUM VELOCITY, MDI ENGINE GROSS HP, MDI LOSS ENGINE HP, M 12 FRONTAL AREA, ft^2 M STEER MOTOR EFF, X m | GRDSS VEHICLE WEIGHT, tons = 40.0 MAXIMUM VELOCITY, mph = 45.0 ENGINE GRDSS HP. = 1000.0 FRONTAL AREA, ft^2 = 68.3 STEER MOTOR EFF,% = 92. | TREAD WIOTH, in. * 109.8 TRACK LENGTH, in. * 183.1 TRACK PITCH, in. * 7.63 NUMBER OF SPROCKET TEETH * 11 ROLLING RESISTANCE,1b por ton* STEER SYS. GEAR RATIO * 99:1 | * 109.8 . * 163.1 : 7.63 :T TEETH * 11 ICE.1b per ton* 100.0 (ATIG * 99:1 | GRADE, X = 0.0 COEFFICIENT OF FRICTION = 0.7 WAXIMUM ACCELERATION, 98 =0.5 COEFICIENT OF DRAG = 1.00 PROPULSION MOTOR EFF.X =94. PROP. SYS. GEAR RATIO = 21:1 | ION × 0.70 96 ×0.50 1.00 • X = 94. |
| sssesssessesses Efficiency c | sessessessessessessessessessessessesses | resectes sector than a of or the | CONFIGURATION II PROPULSION/STEER M | stronectonectonecters. MOTOR SET-UP | sascassescas |
| ************************************** | .5: | 10000000000000000000000000000000000000 | · · · · · · · · · · · · · · · · · · · | 24年季季季季辛辛辛辛辛辛辛辛辛辛辛辛辛辛辛辛辛辛辛辛辛辛辛 | ************************************** |
| VEH. & LAT. & TURN SPEED &ACCEL@RADIUS (mph) & (gs) & (ft) | # LAT.# TURN # INNER SPROCKET #ACCEL@RADIUS #APARNT#PROP # RPM # # (91)# (ft) # HP # HP # | PROCKET * OUTER * RPM \$TORQUE \$APARNT\$PROP \$ *(16ft) \$ HP * HP | # GUTER SPROCKET # #APARNT#PROP # RPM #TORQUE # # HP # #(lbft) # | STEER MOTOR & PROPULSION MOTOR HP & RPM &TORQUE& HP & RPM &TO & & (1bft)* | PROPULSION MOTOR \$SCRUB\$TRANS HP & RPM \$TORQUE\$ HP \$ HP \$ \$(16ft)\$ |
| ************************************** | ************************************** | ###################################### | 24.94 58.74 25773.4 6 4 4 4 4 4 37.64 88.84 25064.4 7 | ###################################### | ###################################### |
| 3.00 #.1470# | 4.09# 161.1# 14.24-33.64-25161.# | 64-25161.4 509.84 4 | 509.80 46.30109.20 24527.00 734.10 7110.20 A | 34.14 7110.24 542.34 4 4 4 4 | -4.94 796.64 -32.04311.74164.9 |
| 4.50 #.2250# 6.00 #.3040# | 6.02# 76.7# 6.9#-16. # # # # # # # # # # # # # # # # # 1. | # 1.74-20149.# 674.0# 6 | 593.94 54.94129.54 24087.47.738.24 7255.24 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | 38.24 7255.24 534.44 4 | -9.1# 1194.9# -40.0#314.2#244.4 # # # # # # # # # 54.3# 1593.2# 179.1#314.5#321.8 |
| 7.50 4.37904 | 9.924 -78.74 B.84 20. 4 4 4 4 11.934-148.44 16.94 39. | 20.84-19859.4 746.44 # # # # # # # # # # # # # # # # # # | 746.44 71.44168.04 23327.4 658.04 7332.54 | 658.00 7332.54 471.30 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | 66.30 1991.40 174.90309.64397.1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| * 5000 | | | 864.54 85.84201.64 22525.4 598.74 6909.64 | # # # # # # # # # # # # # # # # # # # | |
| 12.00 #.5000# | -319.4# 38.5 | # 90.4#-18560.# 881.1# # | 881.12 90.34211.84 21851.4 507.74 6045.94 | 07.7# 6045.9# 441.0# | 441.04 100.74 3186.34 166.04240.44598.3 |
| 13.50 #.5000# # # # 15.00 #.5000# | 24.374-395.04 49.54116. 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | #116.0#-17882.# 901.5# # # # # # # # # # #140.3#-17149.# 922.5#1 | #116.0#-17882.# 901.5# 95.6#223.9# 21145.# 435.8# 5374.1# | 35.8# 5374.1¢ 425.9¢ ¢ ¢ ¢ ¢ 77.5¢ 4836.7¢ 409.9¢ | 425.94 112.34 3584.64 164.64206.74651.3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 |
| | 36.414-509.9* 70.14163 4 4 4 4 4 4 | # # # # # # # # # # # # # # # # # # # | 08.00251.9419646.43 | 29.04 4397.04 393.04 | \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ |
| ** | | | * * | * | 4 4 |

| PEEO . | VEN. # LAI.# JUKN SPEED #ACCEL#RADIUS (mph) # (gs)# (ft) | | # INNER SP | SPRUCKET * RPH #1 * * * | #TORQUE #APAR #(16ft) # HP | Z | OUTER SPROCKET TAPROP & RPM # | #TORQUE # | HP ST | STEER MOTOR | ### ### ### ########################## | PROPULS HP * | RPM MOT | toue. | #SCRUB#TRANS # HP # HP |
|--------|--|---|------------|-------------------------------|-------------------------------|--|-------------------------------|-----------|----------|---------------|--|-----------------|-----------|--------|---|
| 1.00.1 | ** 5000\$ | では、1.00 年。5000年 58、98年~605。0年 99。2年229。7年-13832。4 981。1年179、1年179、4、27、1年179、4、27、1年178、4、1 | 5.04 99.24 | 1229.74- | 13832.4 | 981-14129 | 14799-14 | 17229. | 1 223.04 | 1454444 | 339.04 | **** | ****** | ***** | **** |
| | # | # | 4 | # | - | # | * | * | * | * | * | * | # | 40 | ************* |
| . 50 | # . 5000# | 22.50 0.50000 67.700-618.4*108.6*250.94-12945.# 985.6#136.7#315.7# 16400.# 196.6# 3224.5# 320.2# 198.3# 5974.3# 174.3# 93.8#EZO.8 | 8.4#108.64 | 1250.94- | -12945.# | : 985.6¢136 | .7*315.74 | 16400.4 | 196.6# | 3224.54 | 320.24 | 198.34 | 5974.3\$ | 174.3# | 93.84820. |
| | # | 4 | * | # | • | * | * | * | * | • | * | * | * | 4 | 4 |
| 00 | # . 5000# | 24.00 0.5000 T1.03=-623.6#118.0#271.8#=12049.# 985.7#144.4#332.5# 15569.# 173.5# 3022.9# 301.4# 215.4# 6372.6# 177.5# 82.8#824.# | 3.6#118.04 | 1271-84- | 12049.4 | 985.7*144 | .44332.54 | 15569.# | 173.54 | 3022.94 | 301.44 | 215.44 | 6372.6# | 177.5# | 82 B#824 |
| | * | * | * | * | 4 | # | 4 | # | # | • | * | * | * | 4 | * |
| . 50 | ** 5000* | 25.50 \$.5000\$ 86.96*-621.1#127.6\$292.5\$-11153.\$ 981.3\$152.3\$3\$9.6\$ 14742.\$ 153.1\$ 2845.1\$ 282.6\$ 233.\$\$ 6770.9\$ 181.0\$ 73.1\$821.6 | 1.1#127.44 | 1292.54- | .11153.¢ | : 981.34152 | .34349.64 | 14742.4 | 153.14 | 2845.14 | 282.64 | 233.44 | \$770.9\$ | 181.04 | 73_1#821 |
| - | * | * | * | * | 4 | * | * | * | * | • | * | | * | * | 45 |
| . 00 | * · 2000* | 27.00 \$.5000\$ 97.49\$-611.6\$136.8\$313.0\$-10263.\$ 972.7\$160.\$\$366.9\$ 13926.\$ 135.0\$ 2687.0\$ 264.0\$ 252.0\$ 7169.2\$ 184.6\$ 64.5\$8812.9 | 1.64136.84 | 313.0¢- | 10263. | 972.74160 | .44366.94 | 13924.4 | 135.0* | 2687.04 | 264.04 | 252.0# | 7169.24 | 184.64 | 64.54812. |
| - | * | * | # | # | | * | * | * | * | 4 | * | 4 | * | * | * |
| . 50 | * · 2000# | 28.50 *.5000* 108.62*-595-5#146.2#333.3# -9385.# 960.2#168.6#384.4# 13120.# 119.0# 2545.6# 245.6# 271.4# 7567.5# 188.4# 56.9#198.6 | 5-54146-24 | 1333.34 | -9385. | 960.24168 | .64384.44 | 13120.4 | 119.00 | 2545-64 | 245.64 | 271.4# | 7567.54 | 188.44 | 56.9*798. |
| - | # | * | * | # | * | * | * | * | * | 4 | * | # | 4 | * | * |
| .00 | ** 2000* | 30.00 4.5000* 120.36*-573.64155.64353.44 -8525.4 944.14117.04402.04 12335.4 104.84 2418.34 227.64 291.54 79.5 84 192.24 50.14179.3 | 3.64155.64 | 353.44 | -8525.¢ | 944.14177 | .04402.04 | 12335.4 | 104.84 | 2418.34 | 227.6# | 291.5* | 7965.84 | 192.24 | 50.1*779. |
| ~ | * | # | * | * | # | * | # | * | # | # | * | # | # | * | # |
| - 50 | #- 5000# | 31.50 \$.5000# 132.70#~546.6#165.1#373.5# ~7687.# 924.8#185.5#419.7# 11573.# 92.2# 2303.2# 210.2# 312.2# 8364.1# 196.0# 44.1#755.7 | 6.64165.14 | 373.54 | -7687. | 924.84185 | .54419.74 | 11573.4 | \$2.24 | 2303-24 | 210.2# | 312.2* | 8364.14 | 196.0* | 44.14755. |
| - | * | * | # | # | * | • | * | * | # | # | # | * | * | * | * |
| . 00. | ** 2000\$ | 33.00 #.5000# 14.J.63#-515.1#174.6#393.4# -6877.# | 5.14174.64 | 393.64 | -6877.4 | 902.94194.24437.54 10838.4 | .24437.54 | 10838. | | 2198.54 | 193.34 | 333.44 | 8762.44 | 199.84 | 80.9# 2198.5# 193.3# 333.4# 8762.4# 199.8# 38.7#728. |
| | * | # | * | # | 4 | * | * | * | | # | * | * | * | 4 | # |
| . 50 | # . 5000¢ | 34.50 #.5000# 159.18#-479.7#184.1 | 9.74184.14 | 413.2# | 6091. # | #413.2# -6097.# 878.8#203.0#455.5# 10134.# | *04455.54 | 10134.4 | | 2102.94 | 117.14 | 355.24 | 9160.74 | 203.64 | 70.94 2102.94 177.14 355.24 9160.74 203.64 33.94697.8 |
| - | | * | 4 | * | 4 | # | * | * | # | * | * | * | * | * | * |
| * 00 | \$ 2000¢ | 36.00 \$.5000\$ 173.32*-441.2\$193.8\$433.0\$ -5351.\$ 853.1\$211.9\$473.5\$ | 1.24193.84 | 433°0¢ | -5351.# | 853.1#211 | .94473.54 | 9463.4 | _ | 2015.34 | 161.7# | 377.50 | 9559.04 | 207.44 | 62.0# 2015.3# 161.7# 377.5# 9559.0# 207.4# 29.7#664.7 |
| | | * | # | # | # | 4 | * | 4 | # | * | # | * | * | 4 | * |
| . 50 | ** 2000* | 37.50 *.5000# 188.06*~400.1#203.5\$452.7# ~4642.# 826.1#221.0\$491.6# | 0-1#203-54 | 452.74 | -4642.# | 826.1#221 | .04491.64 | 8827.* | | 1934.74 | 147.0# | 400.20 | 9957.24 | 211.14 | 54.1# 1934.7# 147.0# 400.2# 9957.2# 211.1# 25.9#629.6 |
| | | | | * | * | * | * | # | | # | * | * | * | * | * |
| 00. | ** 5000# | 39.00 \$.5000\$ 203.41\$-357.1\$213. | | 412.34 | -3971.4 | 14472.3# -3971.# 798.4#230.2#509.7# | .24509.74 | 8227.4 | | 1860.34 | 133.14 | 423-341 | 0355.54 | 214.78 | 47.20 1860.30 133.10 423.3010355.50 214.70 22.64593.1 |
| | | | D) | # | | ti | # | # | # | # | # | # | * | * | # |
| . 50 | * 2000¢ | 40.50 #.5000# 219.35#-312.8#223.3#491.9# -3339.# | 2.8#223.3# | #6 - 16 b | | 770.44239.64527.94 | .6*527.94 | 1665.# | 41.0# | 1791.4# | 120.14 | 446.841 | 0753.84 | 218.24 | 41.0# 1791.4# 120.1# 446.8#10753.8# 218.2# 19.6#555.7 |
| | | * | | * | * | * | * | * | * | # | 4 | * | * | * | * |
| .00 | # · 2000# | 42.00 #.5000# 235.90#-267.6#233.3 | | 511.44 | -2748.4 | #511.4# -2748.# 742.6#249.2#546.1# | .2#546.14 | 7142.\$ | | 1727.64 | 107.94 | 470.641 | 1152.10 | 221.64 | 35.5# 1727.6# 107.9# 470.6#11152.1# 221.6# 17.0#517.9 |
| ** | * | * | * | # | * | # | * | * | | * | * | | • | 4 | * |
| . 50 4 | ** 5000# | 43.50 \$.5000\$ 253.06\$-222.1\$243.5\$530.9\$ -2197.\$ 715.4\$258.8\$564.4\$ | 2.1#243.5# | \$30.94 | -2197.# | 715.4#258. | .84564.44 | 6657.* | 30.74 | 30.74 1667.8# | 49-96 | 141.741 | 1550.44 | 225.04 | 96.64 494.7#11550.4# 225.0# 14.7#480. |
| * | * | * | 4 | * | * | # | * | # | # | # | * | * | * | 4 | * |
| * 00. | *0005- | 270-81#-17 | 6.7#253.7# | \$50.4# | -1686.* | #550.44 -1686.# 689.0#268.7#582.7# | ,7#582.7# | 6209.# | | 1612.2# | 86.24 | 519.141 | 1948.74 | 228-24 | 26.44 1612.24 86.24 519.1411948.74 228.24 12.74443.1 |
| ** | * | * | 4 | # | 4 | # | * | | | * | 4 | * | 4 | 4 | * |

| | | | | | SPROCI W.E. RODLER L.M. FERNANDEZ | SPROCKET HORSEPOWER ER REV.DATE ANDEZ | •• | 14 MAY 1985 | | | |
|------------|---|---------------------------------|----------------------|----------|---|--|-------------|---|---------------------------|--|-----|
| | | | | | RUN DAT | RUN DATE: 15-AUG-85:114 | 85:114 | | | | |
| **** | **** | **** | ****** | ******* | **** | **** | ***** | ******* | **** | 在中央企业的企业的企业的企业的企业的企业的企业企业企业企业企业企业企业企业企业企业企 | *** |
| | DATA IN | INPUT: | | | | | | | | | |
| | | | | | | | | | | | |
| GRO MAN | GROSS VEHICL Maximum velo | CLE WEIGHT, to LOCITY, mph = | ë, | 45.0 | TRACK LENGTH, in. = 109.6 | in. = 109.6 | .1 | COEFF | COEFFICIENT OF | COEFFICIENT OF FRICTION = 0.70 | |
| S W | ENGINE GROSS | | 0 | | TRACK PITCH. | PITCH, in. = 7.63 | | MAXIM | UM ACCELER | MAXIMUM ACCELERATION, 98 #0.50 | |
| FRO | LOSS ENGINE FRONTAL AREA | F . | = 120.0 1. = 68.3 | | NUMBER OF SPROCKET TEETH # 11 ROLLING RESISTANCE, 1b por ton* 100.0 | DCKET TEET TANCE, 15 p | IN = 11 | | COEFICIENT OF DRAG * 1.00 | RAG = 1.00 | |
| | RESULTS | 15: | | | | | | | | | |
| | | | | Tunen co | + | DITTER | CO COBOCKET | | & Crous & | CLDUR ATOAMCEDS | |
| SPEED | # ACCEL #8 | | APPARNTS | | RPM #TORQUE #APPAF | Z | * * | RPH *TORQUE * | * 4 | # # # | |
| | *************************************** | , | • | 28.54 | 28.54 -67.34-25773.4 330.444 | 330.44# | 28.5# 67 | 28.5# 67.34#25773.3# | 3# 301.9# | 0.1 | |
| | | | 400 | ** | 47C CO7 & 1C73C-4C 37- | 476 207 | 36.34.67 | 02.00426430.44 | 44 283 AB | 4.50 | |
| 1.504 | 1.50# 0.050# | | *85 *617 *87 *7 | *7.61 | ************ | +07 = 70+ | | 000000000000000000000000000000000000000 | | | |
| 3.00# | # 0.057# | | 10.634 -38.724 | 44.4 | 10.34-19762.4 300.834 | 300.83 | 27.7# 6 | 27.7# 65.25#24213.6# | 6# 115.0# | 158.1 | |
| 4.50# | # 0.120# | | 11.24# -66.17# | 1.54 | 17.74-19675.# 439.42# | 439*45# | 6 #9-07 | 40.6# 95.65824128.78 | 7# 162.6# | 236.3 | |
| *00*9 | # 0.205# | | 11.75# -96.21# | 10.94 | 25.84-19603.4 | 574.01# | 53.2#12 | 53.2#125.31#24059.3# | 3# 206.94 | 314.0 | |
| 7.50# | ¢ 0.271\$ | | 13.894-153.694 | 17.8# | 41.8#-19301.# 665.20# | 665.20# | 62.4#14 | 62.4#147.03#23761.6# | 6# 215.7# | 387.1 | |
| | | | | | | | | | | | |

520.1

198.54

77.74182.66422898.84

209.34

10.34165.35423357.14

61.34-18892.4 735.34# 81.74-18428.4 796.38#

26.0#

0.321# 16.85#-220.40# 0.364# 20.27#-286.78#

#00°6

10.50#

733.7

153.4#

107.7#251.17#20800.0# 114.7#267.08#20063.6#

137.24

165.5#

100.24234.27421383.64

793.0

121.84282.86419225.74 120.64

89.64 208.24-14702.41035.424

80.04 186.24-15551.41020.29*

637.4

178.00

92.8#217.43#21937.8#

52.34 122.54-17453.4 908.174 61.44 143.44-16890.4 953.834 70.44 164.34-16297.4 994.704

0.460# 27.71#-407.10# 0.468# 32.17#-461.26# 0.492# 37.01#-509.86# 0.500# 43.34#-551.21# 0.500# 50.36#-582.70#

13.50#

16.50#

18.00#

0.404# 23.83#-348.80#

43.54 102.04-17956.# 854.86#

34.84

85.3#200.14#22433.3# 188.6#

| *LATERAL TURN # ACCEL #RADIUS # (9%) # (ft) | A HP A | INNER SP PROP # HP # | SPROCKET # RPH # | *TORQUE ¢1 | PPARN | OUTER SPROCKET IT PROP # RPM # HP # | * *TORQUE * *(ftlbs)* | SCRUG HP ## | # TRANSFR# # HP # |
|---|-----------------------|----------------------------|---------------------|------------|-------------------------------|-------------------------------------|-----------------------|----------------|----------------------|
| *005* | 406-904-86-85 #005-00 | 99.2# | 229.74 | -13830.4 | 99.2# 229.7#-13830.#1045.80# | 129.1#299.07#18365.6# | 7#18365.6# | 106.34 | 810.4 |
| *005* | 0.500# 67.72#-618.33# | 108.6 | 250.94 | -12943.# | 108.6# 250.9#-12943.#1051.19# | 136.7*315.65*17490.9* | 5#17490.9# | 93.84 | 820.7 |
| *005* | 0.500# 77.05#-623.52# | 118.0* | 271.84 | -12048.# | 118.0* 271.8*-12048.*1051.53* | 144.44332.51#16609.2# | 1#16509.2# | 85.8 | 824.3 |
| \$005.0 | 0.500# 86.98#-621.03# | 127.4# | 292.54 | -11152.# | 127.44 292.54-11152.41046.924 | 152.34349.61415727.54 | 1#15727.5# | 73.1\$ | 821.5 |
| *005-0 | 0.500# 97.51#-611.45# | 136.84 | 313.04 | -10261.4 | 136.84 313.04-10261.41037.594 | 160.4#366.91#14852.6# | 1#14852.6# | 45.54 | 812.7 |
| 1+005-0 | 0.500#108.65#-595.40# | 146.28 | 333.3# | -9383. | 146.2# 333.3# -9383.#1023.90# | 168.64384.37413990.64 | 7#13990.6# | \$6.9\$ | 798.4 |
| 0.500*1 | 0.5004120.384-573.524 | 155.6# | 353.4# | -8523. | 155.6# 353.4# -8523.#1006.25# | 177.0*401.98*13147.3* | 8#13147.3# | 50.14 | 179.2 |
| 1.50041 | 0.5004132.72#-546.48# | 165-1# | 373.5# | -7685. | 165.14 373.54 -7685.4 985.124 | 185.54419.71412327.54 | 1#12327.5# | 40.44 | 155.6 |
| .50041 | 0.5004145.664-514.94# | 174.64 | 393.4# | -6875.# | 174.64 393.44 -6875.4 961.034 | 194.24437.54#11535.7# | 41.1535.7# | 38.7# | 728.2 |
| 1.50041 | 0.5004159.214-479.574 | 184.2# | 413.34 | 4-5609- | 184.24 413.34 -6095.4 934.494 | 203.04455.47#10775.8# | 7#10775.8# | 33.94 | 697.6 |
| 1.50041 | 0.5004173.354-441.034 | 193.84 | 433.04 | -5349.4 | 193.84 433.04 -5349.4 906.074 | 211.94473.48#10050.7# | 8#10050.7# | 29.74 | 664.5 |
| 0.500*1 | 0.500*188.104-399.96 | 203.54 | 452.74 | -4640- | 203.54 452.74 -4640.4 876.294 | 221.0*491.55# 9362.9# | 54 9362.94 | 25.94 | 629.4 |
| 0.500#2 | 0.500#203.45#-356.96# | 213.4# | 472.34 | -3969. | 213.4# 472.3# -3969.# 845.67# | 230.2*509.69# 8714.2# | 9# 8714.2# | 22.54 | 592.9 |
| 0.500\$2 | 0.500#219.40#-312.62# | 223.3# | 491.94 | -3338.# | 223.3# 491.9# -3338.# 814.72# | 239.64527.88# 8105.9# | 8# 8105.9# | 19.64 | 555.5 |
| 0.497#2 | 0.497#237.11#-263.76# | 233.4# | 511.54 | -2708. | 233.44 511.54 -2708.4 779.794 | 249.1#546.04# 7500.4# | 4# 7500.4# | 16.84 | 513.9 |
| 0.48302 | 0.4834261.814-196.754 | 243.7# | \$31.54 | -1944-# | 243.74 531.54 -1944.4 725.894 | 258.64563.86# 6761.4# | 64 6761.44 | 13.48 | 453.9 |
| 1.467#2 | 0.467#289.79#-127.33# | 254.24 | \$51.4# | -1213.# | 254.2¢ 551.4¢ -1213.¢ 670.68¢ | 268.2#581.68# 6055.6# | 8# 6055.6# | 10.54 | 392.0 |

B.2.D Gear Speeds And Loads at Maximum Turn Conditions

The following tables provide the torque and speed data for all gears during maximum turn conditions. These tables are divided into the same three divisions as the previous tables. The Title Heading and the inputs are the same as the previous section. The data format facilitates analysis by placing speeds and torques of each component in adjacent positions.

The first row of the results section lists the components by name or by identification letter shown on the gear configuration diagrams. The next segment defines the data arrangement; typically RPM above a dotted line and torque in pound-feet immediately below. The data output is immediately below, with horizontal dotted lines for each 1.5 MPH increment, and corresponding and speeds and torques above and below the dotted line.

REVISION: 16-JUL-85 RUN DATE: 20-AUG-85:5 BY: RICK LEWIS; GEAR LOADS AT MAXIMUM TURN CONDITION

INPUT DATA:

ROLLING RESISTANCE, 1b per ton= 100.0 NUMBER OF SPROCKET TEETH: = 11 TREAD WIDTH, in. = 92.5 TRACK LENGTH, in. = 150.0 TRACK PITCH, in. = 6.03 19.5 GROSS VEHICLE WEIGHT, tons = MAXIMUM VELOCITY, mph = 45.0 57.0 ENGINE GROSS HP. = 500.0 LOSS ENGINE HP. = 60.0 FRONTAL AREA, ft-2 =

GRADE, % = 0.0 COEFFICIENT OF FRICTION = 0.70 MAXIMUM ACCELERATION, 95 =0.50 COEFICIENT OF DRAG = 1.00 SET-UP THIN DRIVE MOTOR ALTERNATIVE I # # induction motor Efficiency data for Westinghouse by: Craig Joseph 10-MAY-85

- 76 114. 216-TORQUE ftlbs 8664. 8439. 122. 160-192. 8578. 83. 841T. 8255 8398 8348 # DUTER RPH # TORQUE 12.4 21.* # 99ftlbs # · +6-31.4 10.4 -8579.1 4-14 -8665.1 -6503-1 -6429-1 -6332.1 -6482.1 -6527. # INNER RPE # 26.# -435.4 -530.1 -524.1 -411.1 4.16 -409-1 143.# -408-217.4 -405.1 325.# -399.1 TORQUE DUTER RPK w # 432* 530.1 524.4 385.4 265.# 138.4 886.# **#*666** 524.1 504.1 501.1 1.864 492. 502.1 TORQUE INNER RPM ш # # 166.4 116.# -21. -37. -55°# -124.4 -83.4 5547. 5492. 4304. 4289.1 4276.1 4242-1 4181. TORQUE 0 3 3 DUTER RPM -166.# -200°+ -147.4 -216.# -285-# -338.# -381°# -5159.1 -5547.1 -5278.1 -5264-1 -5251.1 -5492-TORQUE ftx1bs 0 3 3 INNER RPM # #** 109 455.4 -78.4 -135.# -199.* -301.* -652.4 1281.1 1634. 1276.1 1272. 1262. 1244.1 1651. TORQUE ftxlbs DUTER RPK ø # -- 909--1551.-728.# -1634.1 -535°# -1570. -785.# -1566-1 -1027.# -1562.1 -1231. -1553. -1387.# -1535. TORQUE ftxlbs INNER R P K 8 34 1839. 1285.# 236.# 410.4 1-065--384-1 **4.909** 918.4 1376.4 -495-1 -373.1 383.1 -382-1 379.1 TORQUE MOTOR=A OUTER RPE 1840.4 2218.# 491.1 1630.# 2390.# 3127.4 1.964 470.1 3749.4 4224.# 471.1 1-695 466-1 461.1 HOTOR=A TORQUE ftx1bs # INNER R D M 44 # 4.46 114.4 83.4 160. 122.4 192.4 216.# 9308. 9261.1 1.6606 9783. 9687. TORQUE ftxlbs SPROK RPR -1.1896-# # # 4.46-4-1-#*02 -- 99-12.4 21.4 31.4 -9783.1 -7592.1 -7565.1 -7541.1 -7373-1 -7482. TORQUE ftxlbs INNER RPH B-54 MAX # 45 #0°0 4.54 \$0°9 7.5# \$0°6 VEH HOM

| GEAR L MAX # VEH # | LOADS AT MAX INNER # | MAXIMUM TURN C # DUTER # # SPROK # | CONDITION: INNER # | RUN DUTER # MOTOR=A # | N DATE:NO. INNER | . 20-A * OU | 0-AUG-85;5 0UTER # | 5 INNER * C & D | * * | 00TER # | INNER # | OUTER | ** | INNER # | OUTER |
|--------------------------|-------------------------|--|----------------------|-----------------------------|---------------------|----------------|-----------------------|--------------------|-----|--------------------|--------------------|--------|--------------|-------------------|-----------------|
| # HOM | R P | RPM | RPM # | RPM | S. S. | # | RPM | # RPM | # | RPM # | RPM # | RPH | * | RPM # | K O |
| | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE 1 ftxlbs 1 | TORQUE ftxlbs | TORQUE | | TORQUE ftx1bs | TORQUE | | TORQUE'I ftxlbs | rokque ftxlbs | TORQUE | oue 1bs | TORQUE! ftlbs! | TORQUE ftlbs |
| 10.5# | 95. | 239. | 4672.≄ | 1861.* | -1534. | * | -611.# | + -422.# | # | -168.# | 1104.# | - | #*055 | 95.# | 239 |
| - | -7251.1 | 8981.1 | 455.1 | -367.1 | -1515. | - | 1223.1 | -5092 | - | 4112. | 486-1 | 1 | -392.1 | -6224.1 | 8151 |
| 12.0≎ | 128. | 254.* | .4963. | 2503.# | -1630 | 41 | -822. | 448 | # | -226.# | 1173. | - | 592.# | 128.* | 254 |
| - | -7016.1 | 8750.1 | 443.1 | -355. | -1476. | - | 1184. | 1965- 1 | - | 3978.1 | 474-1 | | -380-1 | -6016.4 | 1961 |
| 13.5# | 159.# | 271.* | 5293.≄ | 3107. | -1738 | # | -1020-# | -478 | # | -280. | 1251.# | | 734.# | 159.4 | 271 |
| - | -6758-1 | 8497.1 | 430-1 | -342.1 | -1434- | - | 1140.1 | -4818. | - | 3832. | 460.1 | | -366.1 | -5786.1 | 1723 |
| 15.0# | 188. | 289.≄ | 5651. | 3683.# | -1856. | # | -1209.# | -510 | ** | -332. | 1336.# | | 870. | 188. | 289 |
| - | -6419.1 | 8224.1 | 417.1 | -328. | -1387- | - | 1093.1 | -4663 | - | 3674.1 | 445.1 | | -351.1 | -5539.1 | 7482 |
| | 217. | 308.≄ | 6028.# | 4239.# | -1979 | # | -1392.* | * - 544 · * | # | -383. | 1425.# | | 1002.* | 217. | 308 |
| 5 -0 | B-5 | 7933.1 | 402.1 | -313. | -1338. | - | 1043. | 8655- | - | 3506.1 | 429.1 | , | -335.1 | -5276.1 | 7225 |
| | 245.# | 329.≑ | 6420. | 4780. | -2108- | # | -1570. | ¢ -579. | ## | -431.* | 1517. | | 1130. | 245. | 329 |
| - ; | -5871.1 | 7628-1 | 386-1 | -297.1 | -1287 | - | 991.1 | -4325 | 7 | 3329. | 413. | | -318.1 | 1-6665- | 9569 |
| 19.5# | 272. | 349.₩ | 6824. | 5310.≑ | -2241. | ș, | -1744. | | ** | ±-619- | 1613.# | | 1255. | 272. | 349- |
| - | -5548. | 7312.1 | 370.1 | -281.1 | -1234- | - | 936.1 | -4146. | - | 3146. | 396. | | -300-1 | -4712. | 6577. |
| 21.0# | 298.≄ | 370-# | 7236.# | 5830. | -2376 | # | -1915.* | + -653 | * | -526.* | 1710. | | 1378.* | 298•≄ | 370. |
| - | -5216.1 | 1-8869 | 354.1 | -264-1 | -1179. | - | 880.1 | 1 -3962 | - | 2958. | 378-1 | | -282.1 | -4417. | 6391 |
| 22.5 | 325. | 392. | 7656. | 6344 | -2514 | * | -2083. | -691 | # | -573. | 1810. | | 1500. | 325. | 392 |
| - | -4878-1 | 6658-1 | 337.1 | -247.1 | -1123. | - | 823.1 | -3775. | - | 2766.1 | 360.1 | , | -264-1 | -4117. | 6100 |
| 24.0# | 351.* | 414.4 | 8082. | 6852.≄ | -2554. | # | -2250.* | -729 | ** | -618. | 1910.* | | 1620. | 351. | 414 |
| - | -4537.1 | 6326.1 | 320-1 | -230.1 | -1067. | - | 765.1 | -3587 | - | 2572. | 342.1 | • | -246.1 | -3813. | . 5807 |
| 25.5≄ | 376.≄ | 436.# | 8512. | 7354.# | -2795. | 42 | -2415.# | -768 | # | -564. | 2012. | | 1738. | 376.≄ | 436. |
| <i>i</i> = | -4195.1 | 5994.1 | 304-1 | -212-1 | -1011- | - | 708. | -3399 | - | 2379.1 | 324. | • | -227.1 | -3510. | 5514 |
| 27.0\$ | 402.₽ | 4.58. | 8947. | 7853.≄ | -2938. | 15 | -2579. | + -807. | 15 | ±-601- | 2115. | | 1856. | 405. | 458 |
| - | -3856.1 | 5664.1 | 287.1 | -195.1 | -956- | - | 650.1 | -3212. | - | 2186. | 307.1 | | -209-1 | -3208.1 | 5223. |
| | | | | | | | | | | | | | | | |

| | * SPROK # | SPROK | * * | HOTOR=A | # # | MOTOR=A | s ++ | # # B | 8 8 | * * | # 0 3 3 | 0 9 0 | + | F F F F F F F F F F F F F F F F F F F | * # | E | * | ** | . L |
|----------|--------------------|----------------|-----|---------|-----|---------|------|--------------------|---------|-----|--------------------|------------------|--------|---------------------------------------|-----|------------------|----|-------------------|-----------------|
| # HdH | R P R | RPM | # | RPM | * | RPM | # | R P R | RPM | # | RPH # | RPH | # | RPM | # | RPH | * | RP# | RPM |
| | TORQUE ftxlbs | TORQUE | | TORQUE | | TORQUE | | TORQUE ftxlbs | TORQUE | | TORQUE ftxlbs | TORQUE ftxlbs | | TORQUE | | TORQUE ftx1bs | | TORQUE! ftlbs! | TORQUE ft1bs |
| 28.5# | 427.4 | 4.80. * | # | 9385.* | # | 8349.# | # | -3082. | -2742-# | # | -847. | -753 | 3•‡ | 2218 | # | 1973. | * | 427.* | 480 |
| - | -3520.1 | 5340.1 | = | 270- | - | -178-1 | _ | +901.1 | 594.1 | - | -3028.1 | 1996. | 6.1 | 289 | = | -191- | - | 2910.1 | 4937 |
| 30.0# | 452.≄ | 503. | # | 9825. | 41- | 8841.* | # | -3227.* | -2903. | # | -887. | -198.* | * | 2322 | 11 | 2090- | * | 455.≠ | 503 |
| - | -3192.1 | 5023-1 | | 254-1 | - | -162.1 | _ | -847.1 | 539.1 | - | -2848-1 | 1810. | 0.1 | 272 | - | -173 | ** | 2618.1 | 4657. |
| 31.5# | 478.4 | 525.≄ | # | 10269. | # | 9331.* | # | -3372. | -3064.# | # | -927. | | -842.≄ | 2427 | # | 2206. | # | 478.# | :525 |
| _ | -2872-1 | 4715.1 | - | 239. | _ | -145.1 | _ | -795.1 | 485.1 | _ | -2673. | 1628 | | 255 | - | -155. | - | 2333. | 4386 |
| 33.04 | 502. | 548. | # | 10714.# | # | 9819. | 45 | -3518. | -3225.# | * | \$-196 - | -886• | #•9 | 2532 | ** | 2321. | 4 | 502.# | 548 |
| - | -2562-1 | 4417.1 | - | 224-1 | _ | -130-1 | _ | -145-1 | 432.1 | | -2505-1 | 1453 | 3.1 | 239 | - | -139 | - | 2057.1 | 4124. |
| 2# | 527. | 571.* | 44 | 11161. | # | 10305.* | 4 | -3665. | -3384. | * | -1007.4 | • | 930.4 | 2638 | # | 2436 | # | 527.# | 571 |
| ! · B | -2264.1 | 4132.1 | - | 209-1 | - | -115.1 | - | 1-697-1 | 382. | _ | -2343.1 | 1284 | 1 - 4 | 224 | - | -123 | - | -1791.1 | 3873 |
| -56 | 552. | 594.# | 46 | 11610. | # | 10790.# | 45 | -3813.# | -3543. | 48 | -1048. | #-916- | # | 2744.* | # | . 2550- | 15 | 552.# | 594. |
| i | -1978.1 | 3860-1 | - | 196-1 | _ | -1001- | - | -651.1 | 334.1 | - | -2189. | 1122 | 2.1 | 209 | - | -107. | - | -1537-1 | 3634. |
| 37.5¢ | 577.* | 617.* | # | 12060. | # | 11273.# | 45 | -3960- | -3702. | * | -1088. | -1017. | ** | 2851 | # | 2665. | 15 | \$17. | 617. |
| - | -1706.1 | 3602. | - | 182. | _ | -86-1 | - | -608-1 | 288. | _ | -2043.1 | 896 | 8.1 | 195 | - | -92 | - | 1295.1 | 3407. |
| 39.0≄ | 602.* | \$ *0+9 | # | 12512.# | # | 11755.# | 45 | -4109. | -3860. | 45 | -1129. | -1061. | ** | 2957 | # | 2778. | 45 | 602.≄ | 640 |
| - | -1449.1 | 3360.1 | - | 170-1 | _ | -73.1 | - | -567.1 | 244- | _ | -1905.1 | 822 | 2.1 | 182 | - | -78-1 | - | 1065. | 3194. |
| 40.5# | 626. | 663.* | # | 12964.# | 44 | 12236.# | 45 | -4257.# | -4018. | * | -1170.4 | -1104. | # | 3064.# | # | 2892.≄ | # | 626.# | 663 |
| - | -1206.1 | 3132.1 | 7 | 159. | _ | -61.1 | _ | -528-1 | 204-1 | - | -1776.1 | | 684.1 | 110 | - | -65. | - | -848- | 2994. |
| 42.0# | 651. | 687.* | # | 13418.* | * | 12715. | 45 | **90 55- | -4176. | # | -1211.* | -1148.# | # 80 | 3172 | # | 3005 | 44 | 651. | 687 |
| - | -979-1 | 2921.1 | - | 148. | - | -50.1 | _ | -493. | 165. | _ | -1656.1 | 555 | 5.1 | 158. | 7 | -53.1 | - | -645. | 2809. |
| 43.54 | 675.# | 710.# | # | 13873.# | * | 13194.# | 45- | -4556• \$ | -4333. | # | -1252.* | -1191 | # . | 3279.# | # | 3119. | # | 675.# | 710. |
| - | -766.1 | 2725. | - | 138. | | -39. | _ | -460.1 | 129. | _ | -1545- | | 435-1 | 141 | = | -41 | - | -455. | 2637 |
| 45.0≄ | 700° | 733. | # | 14328.# | # | 13672.# | # | -4105.₽ | ±*0675- | # | -1293.* | -1234.* | * | 3387 | * | 3232. | # | 700. | 733. |
| - | 9.1 | .2544-1 | - | 129. | - | -29.1 | _ | -429. | | - | -1443. | | 323.1 | 138-1 | = | -31- | - | -278 | 2479. |

| | | 19.5 TREAD HIDTH, in. * 92.5 GRADE, I * 0.0 TRACK LENGTH, in. * 150.0 TRACK PITCH, in. * 150.0 TRACK PITCH, in. * 150.0 NAXIMUM ACCELERATION * 0.70 NUMBER OF SPROCKET TEETH * 11 COFFICIENT OF DRAG * 1.00 ROLLING RESISTANCE, ib por ton* 100.0 PROPUSION MOTOR FF, I * 94. STEER SYS. GEAR RATIO * 99:1 PROP. SYS. GEAR RATIO * 21:1 | | * 1 * | RPH & | -398. | 309. | -455.4 | 4236. | -463.0 | 4177. | -411-# | 4126. | #-614- | 4080. | -415.4 | 3654. | -414- |
|---|-------------|--|--|--|---|-----------|-----------------|-------------|-----------------|-------------------------------|-----------------|--------------|-----------------|--------------|----------------|--------------|----------|--------------|
| *** | | | | *** | WELTO | 525.4 - | 4 1.9 | | - | | | | - | | | 4 | 1.5 | ** |
| * | | 14 44 44 | | * * | RPH TOROT | - | 1126.1 | 1743.0 | 1107 | 1773.0 | - | 1803. | 107 | 1832 | 1066.1 | 1819 | 95 | 158 |
| *** | | 4 4 4 | | ************************************** | A RPM & RPM | * | -912.1 | # 0 | 1.768 | 0.4 | 884.1 | **0 | 873.1 | 0.4 | 864.1 | 0.4 | -174.1 | *.0 |
| * | | 00 4 | | *** | # E TO | * | - | 6 | 8- 1- | * | - 1-8 | * | - | * | 8 | * | - | # |
| * | | 0.70 = 0.50 14. | | * * I | RPH TATE | .#-2456. | -175 | . *-2808 | -172 | -4-2856 | -169.1 | -2905 | -167 | -2952 | -165 | -2930 | -148 | -2554 |
| ** | | 10N = 1.00 ± 1.00 ± 2.0 | | 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | H & | 8038.# | 214.1 | 9190. | 210.1 | 9347.4 | 207.1 | 9507-4-2905 | 204.1 | 9662-#-2952. | 202.1 | 9589.4-2930. | 181.1 | 359.#-2554 |
| * | | O-0 OF FRICTION LERATION, G. F DRAG = 1. IDTOR EFF, K. | | #STEER | # RPH TTORO | 0.# 80 | .1 2 | # | -1 2 | 1 | - | | | 96 #*0 | 1 | 0.4 95 | .1 | .# 83 |
| * | | GRADE. % == 0.0 COEFFICIENT OF FRICTION WAXIMUM ACCELERATION. COEFICIENT OF DRAG == 1 PROPLISION MOTOR EFF= 1 PROP. SYS. GEAR RATIO | | esestatesestatesestatesesestatesesestatesesstatesesstatesesstatesestatesestatesestatesestatesestatesestatesesta sinner acuter ainner acuter ainner acuter acuter ainner acuter ainner astreer a a b a c a c a d b b a b a e a e a f a f a motor of | RPH ORQUE tx1bs | 0 | 7337. | 0 | 7267. | **0 | 7200. | **0 | 7136.1 | ď | 7075.1 | 6 | 5717. | ó |
| * | | COEFICIENT MAXIMUM ACCI COEFICIENT PROPULSION PROP. SYS. | SET-UP | *** | # # | #*0 | 7. | **0 | - | **0 | _ | ** | 3.1 | # 0 | | | • | **0 |
| 9: | | COEFFICIENT MAXIMUM ACCOEFFICIENT COEFFICIENT PROPULSION PROP. SYS. | SET | ###################################### | # RPH 11080 | | -733 | | -1-715 | 25 | -1023. | | 1-691 | | 1-682 | | 1-6727.1 | # |
| 8-JUN-85 7-AUG-85:0 | | SO XO X A | MOTOR | ###################################### | RPH ORQUE txlbs | 161.4 | 815.1 | 137.4 | 807. | 92.4 | 800.1 | 4.8. | 793.1 | 3.4 | 1.987 | 4.94- | 635.1 | -119.# |
| w 1- w | | 100.0 | TEER | *** | WEITO bs ft | *: | 5.1 | \$ · 2 | 5.1 | 3.4 | | * | - | ** | 58.1 | # | | |
| SION: DATE: | | # 11 ton= 99:1 | IVE | ************************************** | TORO | 161. | -81 | -235- | - 79 | -283. | -780.1 | -334.# | -768. | | - | 164-1 | -747 | \$ -454.# |
| RUN | | 92.5 150.0 .03 EETH = b per t 0 = 99 | ALTERNATIVE II PROPULSION/STEER | # # # 0 | ORQUE! | -323.# | 2446.1-2446.1 | -274.# | 2422.1 | -184.# | -2400.1 | -95.4 | 2304-1-2379-1 | #-9- | 358.1 | 93.4 | -19061- | 237. |
| 15: | | TREAD WIDTH, in. = 92.5 TRACK LENGTH, in. = 150.0 MUMBER OF SPROCKE I FETH : ROLLING RESISTANCE I D per STEER SYS. GEAR RATIO = 0 | PRO | ###################################### | # R | 323.\$ - | -1-5 | - 4.594 | 2386.1-2 | | - | **899 | 7-1- | 170.4 | 1.1-23 | 863.# | | * |
| K LEVI | | MIDIN, in. = LENGTH, in. = PITCH, in. = COF SPROCKET COF SPROCKET COF SPS. GEAR RA | | ###################################### | TOROL | 1 | | | 238(| | 2341 | | | | 2273.1 | | 2242.1 | 606 |
| RICK | | MIDTH, in. LENGTH, in. PITCH, in. OF SPROCKEI IG RESISTANCE SYS. GEAR RI | ** | ###### NER # | RPH # | -410. | 5089.1 | -538. | -5005- | -547.4 | -4932. | -556.4 | 1-218 | -565. | -4818-1 | -561.4 | 315.1 | -489. |
| 94: | | K LENGTH PITCHER OF STATE | 0 | # # INNER | E TO | | .1-5(| 4 | - | | - | | -1-4872 | # | 1 | * | 1 | |
| ** | | TREAD TRACK TRACK NUMBER STEER | induction motor | ************************************** | RPH ORQU | 410 | 5089.1- | 538 | 2005 | 241 | 4932 | \$56.4 | 4872 | 565 | 4818.1 | 561 | 4315. | 4.89.4 |
| 2 0 | | · 4 | Andu | # # # # # # | A DOE | 28.\$ | -487.1 | 1712.# | -476.1 | 2044.# | 67.1 | 2376.# | 1.09 | 07.4 | 54.1 | 3004.# | -441.1 | 3124.4 |
| 1110N | | | | DESCRIPTION OF THE CO. | | # 1228 | - | * | - | 4 | - | | 7 | | - | | - | * |
| COND | | tons = 45. | ting! | UTER | E RPH E TORQUE | 0.4-1228. | 487. | 1096 | 1 482. | -812. | 477. | -529. | 473 | -245 | 468 | 74. | 385 | 570. |
| TURN | | 500° + 4 | 240 | P # 0 | T POET | 0.4 | 0.1 487. | 504.4-1096. | -7.1 | 4.10 | -12.1 | | -15.1 | | -17.1 | 2518.4 | 1.89 | 22.4 |
| INUM | # ! | HEIGHT STATE | a for | # PR | # #P | | | | | 142.4 1007.4 | - | 167.4 1511.4 | | 193.# 2015.# | _ | | | 227.# 3022.# |
| GEAR LOADS AT MAXIMUM TURN COND eedbedebedebedbedbedgedgeboegtebed | INPUT DATA: | GROSS VEHICLE HEIGHT, tone ** MAXIMUM VELOCITY, mph ** 45. ENGINE GROSS HP. ** 500.0 LOSS ENGINE HP. ** 60.0 FRONTAL AREA, f42 ** 57.0 STEER MOTOR EFF, % ** 92. | Efficiency data for Westingh by Craig Joseph 10-MAY | stettstettstettstettstettstettstett MAX SINNER SOUTER & PROP SOUTER VEH SSPROK SSPROK #MOTOR & B | TORQUEITORQUEITORQUEITORQUE | 81.4 | 1-9783.1 9783.1 | 116.4 | 1-9689-1 9544-1 | 3.04 -46.4 142.4 1007.4 -812. | 1-9600.1 9364.1 | 167. | 1-9515.1 9218.1 | 193. | -9433-1 9093-1 | 216.# | 8970.1 | 227. |
| DS AT | INPU | VEHI E GRC ENGIN | tency by (| R #0 | # I | -81.4 | 3.1 | -68.# | 1.6 | -46.4 | 1.0 | -24.8 | 5.1 | -1.8 | 13.1 | 23.4 | | \$65 |
| 1 LOA | | AAXIM NGIN OSS TEER | 1110 | STATESTATES MAX SINNER | TORO | # # | 1-978 | | 1-968 | 1 | 1-960 | | 1-951 | | | | 1-7623.1 | |
| GEAG | | | | AAK FEN A | H d | *0.0 | | 1.54 | | 3.0¢ | | 4.54 | | *0.9 | - | 7.54 | | 40.6 |

| TORQUE| TORQ -736.1 908.1 3475.1 -713.1 880.1 3368.1 850. 3253. 818.1 3131.1 785.1 3003.1 714.1 2732.1 617.1 2591.1 602.1 2304.1 527.1 2018.1 # 0.# 1359.# 0.# 1189.# 865.4 750.1 \$18·# 640.1 564.1 634.4 595.0 \$60.4 RPH # 4.0 1-685-**0 -663-1 **0 -636-1 **0 *.0 # · 0 #.0 **0 #*0 -607.1 -578.1 -548.1 -518.1 -488--82.1 -427.1 1-457-1 R P H 7 # 63.4 342.1 -394.1 3842.1-3842.1 2003.1-1690.1 -668.1 563.1-6010.1 5069.1 161.1 -132.1 604-1-6395-1 5438-1 172-1 -141-1 585.1-6207.1 5262.1 167.1 -137.1 0.4 7165.4-2189.4 0.# 6269.#-1916.# 5573.4-1703.4 66.1 282.1 -336.1 3226.1-3226.1 1714.1-1387.1 -571.1 462.1-5141.1 4161.1 135.1 -111.1 265.1 -320.1 3059.1-3059.1 1637.1-1304.1 -546.1 435.1-4910.1 3912.1 128.1 -105.1 1.66--93. 5016.4-1533.4 540-1-5803-1 4859-1 155-1 -127-1 4560.4-1393.4 515-[-5589-] 4637-] 149-[-122-] 0.4 4180.4-1277.4 -116.1 0.4 3858.4-1179.4 3583.4-1095.¢ 0.# 3344.#-1022.# -958-¢ -902.# -851.4 -88-RPH I # # # 232.1 -289.1 2721.1-2721.1 1481.1-1134.1 -494.1 378.1-4443.1 3403.1 114.1 489.1-5368.1 4403.1 142.1 121.1 198.1 -258.1 2383.1-2383.1 1327.1 -964.1 -442.1 321.1-3980.1 2892.1 100.1 3135.4 2950.* 107.1 0.# 2786.# # E # F # F # MUTOR # STEER WHOTOR # RPH # 0 4.0 *.0 **0 #.0 **0 406-1-4677-1 3658-1 215.4 -274.1 2551.1-2551.1 1404.1-1049.1 -468.1 350.1-4211.1 3146.1 # RPM u. **0 **0 **0 **0 4.0 **0 **0 **0 ..0 **0 # 0 **0 # RPH u. # 419.4 -419.4 956.4 381.4 -478.4 -190.4 -256.4 中*964--489.4 -543.4 -597.4 -753.4 -318.a -377.4 9066.# 5114.# 5966.# 163.# -163.# 1831.# 1607.# -916.# -804.# ±-649--101-# RPM ш 65.1 298.1 -351.1 3388.1-3388.1 1789.1-1468.1 -596.1 64.1 367.1 -419.1 4104.1-4104.1 2132.1-1813.1 -711.1 355.1 -407.1 3977.1-3977.1 2069.1-1754.1 -690.1 63.1 328.1 -380.1 3698.1-3698.1 1934.1-1620.1 -645.1 -366.| 3546.|-3546.| 1863.|-1546.| -621.| 367.4 -367.4 1016.4 512.4 -508.4 293.4 -293.4 1157.4 754.4 -578.4 -617.4 978.4 -657.4 349.4 6547.4 3412.4 4591.4 226.4 -226.4 1397.4 1087.4 -698.4 210.t -210.t 1481.t 1193.t -741.t 196.4 -196.4 1567.4 1299.4 -784.4 249.1 -305.1 2891.1-2891.1 1559.1-1219.1 -520.1 8058.# 4446.# 5403.# 183.# -183.# 1654.# 1402.# -827.# 4782.# 5683.# 173.# -173.# 1742.# 1505.# -871.# -542.# AT MAXIMUM TURN CONDITION
RUN DATE:No. 7-AUG-95:6
#GUTER # PROP #DUTER #INNER #GUTER #INNER #GUTER
#SPROK #MOTOR # 8 # 8 # C # C # 0 # 0 # E # RPH 636.4 4082.# 267.# -267.# 1234.# 868.# # RPM # RPM 245.# -245.# 1314.# 326.4 -326.4 1084.4 * RPM * * 95.¢ 239.¢ 3525.¢ 1060.¢ 3249.¢ 5036.# 2312.# 3844.# 370.# 7051.# 3762.# 4856.# 3621.4 6044.4 3055.4 4332.4 3420.# 5128.0 * * 4533.# 1919.# 4029.4 1504.# 5540.0 2689.0 313.1 4106.4 * RPM 1 - 49 67.1 94. 69.1 70-1 72.1 73.1 7555.4 8562.4 # KPK # KPE 329.4 271.4 1-7251-1 8527-1 1-7016-1 8276-1 1-6758.1 8013.1 15.04 188.4 289.4 1-6479.1 7738.1 7452.1 1-5871.1 7157.1 1-5548.1 6855.1 1-5216-1 6547.1 392.4 1-4878.1 6236.1 414.4 25.54 376.4 436.# 4.88.4 1-4537.1 5925.1 1-4195.1 5614.1 1-3856.1 5307.1 8.0¢ 245.¢ 19.54 272.4 1-6183.1 24.04 351.4 GEAR LDADS ANAX SINNER OF MPH # MPH 10.5ª 12.0#

491.1 1878.1 455.1 1741.1 420.1 1607.1 386.1 1478.1 354. 1354.1 323.1 1236.1 294. | 1124. 266. 1 1018. | TORQUE| TORQ HOX # 435.4 381.4 366-4 193. 317.4 4.914 4.53.4 414.4 340.# 501.4 # RPH × #.0 **0 **0 #.0 **0 4.0 # 0 4.0 #*0 -156.1 -76-1 -398-1 -71-1 -368-1 **0 -65.1 -340.1 -60.1 -313.1 ** -55.1 -287.1 # · 0 -262--46.1 -238.1 -216.1 -194.1 -175.1 # RPH -41.1 -37.1 -33.1 -30. -50.1 -511.# -528.4 . 0.¢ 2640.¢ -807.¢ -766.# -730.¢ 0.# 2280.4 -697.4 ±-999--636° -613.¢ -589.4 -568.4 -547.A * RPM # RPM I 0.# 1858.# 46.1 0.# 1672.# 33.1 93.1 86.1 80.1 73.1 67.1 61.1 0.# 2006.# 56.1 50.1 0.# 1791.# 41.1 1730.4 37.1 # # 0.# 2508.¢ 0.# 2388.¢ 0.4 2181.4 0.4 2090.# 0.4 1929.4 *INNER *OUTER *INNER *OUTER *INNER *STEER * O * E * E * F * F * MOTOR **0 80.1 -151.1 1202.1-1202.1 793.1 -362.1 -264.1 121.1-2380.1 1087.1 575.1 427.1 239.1-3319.1 2154.1 189.1-2914.1 1698.1 92. | -162. | 1327. | -1327. | 849. | -427. | -283. | 142. | -2548. | 1280. | 905.1 134. 293-1-3754-1 2640-1 266.1-3533.1 2394.1 80. 134. 1-200. 1746. 1-746. 1037. 1-541. 1-346. 214. 1-3112. 1922. 165.1-2726.1 1484.1 # RPM # RPM #.0 **0 **0 **0 **0 **0 * 0 **0 *.0 *.0 * 0 47.1-1817.1 # 0 101.1-2223.1 82.1-2077.1 64.1-1941.1 -98.# 2933.# 2799.#-1466.#-1399.# 122.# -122.# 2376.# 2209.#-1188.#-1104.# 617. #12591. # 7388.# 8001. # 117. # -117. # 2469. # 2307. #-1234. #-1154. # 2603.4-1373.4-1301.4 2840.# 2701.#-1420.#-1350.# +*506-128.# -128.# 2285.# 2109.#-1142.#-1055.# 113.# -113.# 2561.# 2406.#-1281.#-1203.# 109.4 -109.4 2654.4 2505.4-1327.4-1252.4 480.# 9569.# 5445.# 6251.# 154.# -154.# 1921.# 1709.# -960.# -854.# -955° 548.411080.4 6423.4 7119.4 133.4 -133.4 2193.4 2010.4-1097.4-1005.4 W RPH & RPH 75.1 182.1 -243.1 2217.1-2217.1 1251.1 -880.1 -417.1 -214. 1898. |-1898. | 1106. | -718. | -369. | 165.1 -228.1 2055.1-2055.1 1178.1 -798.1 -393.1 82.| 120.| -187.| 1599.|-1599.| 971.| -566.| -324.| 741.1 -302.1 -247.1 606.1 -142.1 -202.1 909.1 -495.1 -303.1 647.1 -192.1 -216.1 147.# -147.# 2011.# 1810.#-1006.# 140.# -140.# 2102.# 1910.#-1051.# 975.1 -975.1 692.1 -245.1 -231.1 7-AUG-85:6 # RPM 105.4 -105.4 2747.4 *OUTER *INNER *OUTER # RPM 0 # 873.1 -873.1 -101-# 778.1 -778.1 106.1 -174.1 1460.1-1460.1 68.1 -140.1 1085.1-1085.1 # RPH # RPH ں 101.4 4.86 u 503.410073.4 5772.4 6539.¢ 6746.# 7412.# 594.#12087.# 7067.# 7706.# 640.#13095.# 7708.# 8297.# 663.#13598.# 8026.# 8594.# 687.#14102.# 8344.# 8892.# 56.1 -130.1 46.1 -121.1 700.# 733.#15109.# 8978.# 9489.# 36.1 -113.1 # 6099.# 6828.# 8661.# 9190.# AT MAXIMUM TURN CONDITION #OUTER # PROP #OUTER # INNER # SPROK #MOTOR # 8 # 8 # RPM # RPM # RPM 8 150.1 80 87.1 93.1 89.1 92.1 #SPROK #MOTOR # 17.1 \$25.410576.4 78.1 571.411584.4 84.1 710.#14606.# 85.1 90.1 1-2264-1 3886-1 2964.1 -767.1 2588.1 1-3192.1 4711.1 3635.1 1-1706-1 3397-1 [-1449.] 3173.[1-3520-1 5005.1 1-2562-1 4150-1 -979.1 2769.1 4425.1 MPH & RPH & RPH 427.4 1-2872-1 527.4 552.4 1-1978.1 \$17.4 626.# 1-1206.1 651.# 675.# 502.4 602. 452.4 31.54 478.t GEAR LDADS A MAX #INNER A VEH #SPROK 4 36.04 *0.66 28.54 30.04 33.04 37.54 40.54 \$5.0¢ 43.54 \$0.59

| GEAR LOADS AT MAX | ************************************** | 存存的 化合物合物 化化物 化化物 化化物 化化物 化化物 化化物 化化物 化化物 化 |
|--|---|---|
| INPUT DATA: | | **** |
| GROSS VEHICLE WEIGH MAXIMUM VELOCITY, MENGINE GROSS HP. ME LOSS ENGINE HP. MERONIAL AREA, ft?2 | GROSS VEHICLE WEIGHT, tons = 19.5 TREAD WIDTH, in. = 92.5 GRADE, % = 0.0 MAXIMUM VELOCITY, mph = 45.0 TRACK LENGTH, in. = 150.0 COEFFICIENT OF FRICTION = 0.70 ENGINE GROSS HP. = 500.0 TRACK PITCH, in. = 6.03 MAXIMUM ACCELERATION, gs =0.50 LOSS ENGINE HP. = 60.0 NUMBER OF SPROCKET TEETH = 11 COEFICIENT OF DRAG = 1.00 FRONTAL AREA, ft^2 = 57.0 ROLLING RESISTANCE, 1b per ton= 100.0 | |
| seceessessessesses Efficien by Gene | ###################################### | *********** |
| CONTROL CONTRACTOR CONTRACT INNER WITH A SPROK ASPROK WOTOR | ************************************** | ************************************** |
| A MON ON THE MAN | кри ф кри | RPM & RPM # |
| TORQUE TORQU TORQUE ftxlbs ftlbs ftxlbs | Torque Torque Torque T | TORQUE TORQUE ftx bs |
| 0.0* -89.* 89.* | # -1861.# 1862.# 2127# -2127# -677.# 677.# 891.# -891.# 0.# 0.# -24 | #*0 #*0 |
| -9783.19783.1 | | 6239-1-6239-1 |
| 1.54 -61.4 109.4 | -61.# 109.# -1278.# 2279.# 1461# -2604# -465.# 829.# 612.#-1090.# 0.# 0.# -168.# 300.# 222.# -395.# | **0 **0 |
| 1-9681-19581-1 | | 6174-1-6174-1 |
| 3.04 13.4 83.4 | | 4.0 |
| 1-7585-19301-1 | 3301.1 444.1 -362.1 106.1 -130.1 -996.1 1221.1 2270.1-2784.1 1752.1-2149.1-2748.1 3370.112531.1-153674 | 4837.1-5931.1 |
| 4.5# 22.# 122.# | 122.4 453.4 2549.4 -5174 -2912# 165.4 927.4 -217.4-1219.4 0.4 0.4 60.4 336.4 -78.4 -442.4 | 0.4 0.4 |
| | 443.1 | 4820-1-5916-1 |
| 6.0# 32.# 159.# | 159.4 665.4 3337.¢ -7594 -3814¢ 242.¢ 1214.¢ -318.¢-1597.¢ 0.¢ 0.¢ 88.¢ 640.¢ -115.¢ -579.¢ | **0 **0 |
| 1-7535-19255-1 | 1255.1 442.1 -360.1 105.1 -129.1 -989.1 1215.1 2255.1-2770.1 1741.1-2138.1-2730.1 3353.112449.1-15291# | 4805.1-5902.1 |
| 7.5# 51.# 188.# | 188.# 1067.# 3936.# -1219# -4498# 388.# 1431.# -510.#-1883.# 0.# 0.# 141.# 519.# -185.# -682.# | |
| 1-7450-19172-1 | 1172-1 438-1 -356-1 104-1 -128-1 -978-1 1204-1 2230-1-2745-1 1721-1-2119-1-2699-1 3323-112308-1-15154* | 4751.1-5849.1 |
| 9.04 76.* 211.4 | 211.¢ 1585.¢ 4418.¢ -1811¢ -5048¢ 577.¢ 1605.¢ -759.¢-2114.¢ 0.¢ 0.¢ 209.¢ 582.¢ -275.¢ -766.¢ | **** |
| 1-7321-19047-1 | 0647-1 432-1 -349-1 102-1 -126-1 -961-1 1188-1 2191-1-2708-1 1692-1-2090-1-2553-1 3278-112096-1-14947# | 4669-1-5769-1 |
| | | |

| UTER # | RPM | DRQUE | * | 5676. | **0 | 5580.1 | 0.4 | 5418. | 0.4 | 5244. | 0.4 | \$059. | 0.* | 9 | **0 | -4663. | 9.0 | 56 | • | 4246. | 0.4 | 4034. | 0.4 | 3822. | 0 | |
|--|---------|----------------|---------------|---------------|-------------|----------------|-------------|----------------|-----------|----------------|--------------|-----------------|-------------|----------------|--------------|----------------|-------------|---------------|-------------|----------------|-------------|----------------|-------------|----------------|--------------|---|
| # # | # | # ± | 4 | ÷ | | - | #*0 | + | **0 | -1°28 | | 3.1- | *** | 4-1-4 | * | 1 7 | | 26.1-44 | * | + | 4 | + | | + | 4 | |
| SER | H | OROU tx1b | 0 | 574 | • | 44.14 | 0 | 4309 | 0 | 4132 | 0 | 3943 | 0 | 3744 | 0 | 3538 | 0 | 3326 | 0 | 3111.1- | • | 2893 | 0 | 2675 | 0 | - |
| N # | # | | 4 | * | * | 1 | * | • | | #9 | # | * | * | | * | # | | * | | | # | | # | # | # | - |
| FER | I | RQUE ×163 | 9 4 4 | 4707 | 22 | 4456# | * | 4038 | -1050 | -1358 | 20 | 310 | 193. | 2603* | 00 | 1 00 | 345 | 4 | 423 | -11000 | ~ | 0451 | 585 | 966 | 563 | 1 |
| *00T | * | 110 | | | 6- # | - | 6- # | | * | - | \$-11 | | 4-1 | - | .*-126 | 1-120 | 1-4 | -1-115 | - | - | *-150 | 1-104 | 1-1 | - | | - |
| NNER | RPM | ORQUE | 370. | 20 | -465. | 265 | -577. | 165. | -684. | 07 05 - | 788- | 0215. | -888- | 9700. | -987. | 9166. | . 980 | 618 | 1179. | 059 | -1273. | 7495. | 367. | 931. | 459 | |
| Z | 4 | == | 4 | 5.1118 | # | 111 | 4 | Ξ | * | = | # | = | 45 | - | # | - | 4-1 | - | # | 8 | -4- | - | 1-4 | 9 | - | |
| 2 | × | 200E | 641. | 225. | 701. | 3170. | 748. | 3079. 111165 | 198. | 2980- | 951. | 2874. | 907. | 764. | . 996 | 649 | 022 | 532. | 081. | 2412. | 141 | 292. | 202. | 12 | 264. | - |
| #0UT | 2 | ITORO | * | 3: | * | - | | 1 | | - | * | _ | # | 1 2 | # | - 2 | # | 1 2 | | - | # | 1 22 | # | 1 21 | # | - |
| œ | x | TORQUE | 81. | 2599. | 354. | 2542. | 39.4 | 1.644 | 20.# | 348 | 99 | 240. | 10 | 27. | 50. | 10 | 23. | 890. | 96 | 67. | 968. | 644. | 39. | 20. | 60 | 1 |
| INNE | 8 | ftx f | ~ | 1 | | 1 1 | 4 | 7 | 80 | 1-23 | in | 7 | | -21 | ~ | -201 | 80 | - | 60 | -11 | | -16 | 10 | -15 | 11 | - |
| # # | * | QUE | **0 | 57.1 | #*0 | 022.1 | **0 | 3.1 | **0 | 00 | *. | 33.1 | | 62.1- | 0.4 | 89.1 | | | **0 | 38.1 | | 52. | * | 85. | | |
| OUTE | 2 | TORG | | -205 | | -202 | | -1963 | | -190 | | -18 | | -176 | | -16 | | -161 | | -15 | | -146 | | -13 | | 1 |
| # # | * | S | * | - | #*0 | - | **0 | - | **0 | 97.1 | *** | 28.1 | **0 | 57.1 | **0 | 82.1 | * | 05.1 | #*0 | 27.1 | 4.0 | | **0 | 9.1 | **0 | 1 |
| ENNER | M d | 0RQ tx1 | | 1657 | | 1621 | | 1561 | | 149 | | 142 | | 135 | | 128 | | 120 | | 112 | | 104 | | 96 | | 1 |
| # # | * | QUE IT | *.6 | = | * | -6 | ** | 3 | * | - | 2.4 | - | 3.4 | 3.1 | * | | ** | 1.2 | #. | 3.1 | 5.4 | 3.1 | ** | - | 4.6 | - |
| UTER | RPH | URGE | 232 | 1992 | 254 | 5 | #-271 | 2543 | 2898 | 2461 | 309 | 3 | 329 | -228 | 3500 | -218 | 3712. | 2092. | 3927. | 66 | * | -189 | 4366 | -119 | -458 | 1 |
| no# | 44 | == | 45 | -1-5 | 45 | -1-2 | | + | * | 9-1- | # | -1-5 | # | 7 | | 1 7 | | -1-5 | | 1 | 4.4-41 | - | # | - | # | - |
| NNER # | RPR | ORQUE txlbs | 022 | 2147 | 284 | 2100 | 593 | 2023 | 889 | 93 | 174 | 851 | 452. | 757 | 2723. | 661 | 1667 | 561 | 3254 | 1460 | 3514 | 1358 | 3112 | 1256 | 970 | 1 |
| Z | # | == | .4-1 | .1.2 | *- | -1 - | *-1 | -1 - | .4-1 | | -#- | - | -8- | - | -0- | - | -4- | | 4-3 | - | # | - | * | - | 4-4 | 1 |
| TER B | E | A 1 ps | 10 | 69 | 935. | 1 6 | 063. | 1115. | 203 | 8 | 350. | 1041 | 03 | 5 | 2660 | 960 | 21 | 917 | 984 | 874 | 50 | 8 30 | 318 | 181 | 3488 | - |
| #OUTER | 4 8 | TOROUE | # 17 | 11 | * | = | # 20 | _ | 2 # | 10 | * 5 | - | . 25 | 01 | # | _ | . t 28 | _ | - 8 2 | _ | . 31 | _ | m # | _ | # | 1 |
| œ | £ | m A | 111. | 945. | 16. | 921. | 1211. | 87. | 36. | 51. | 52. | 812. | 63 | 7 | 10. | 28. | 273. | 685. | 73 | .0 | 2671. | .96 | 67. | 51. | 61. | 1 |
| NN I | 2 | TOROU | | ' | 6 | ! ! | | 00 | # 1* | | 1 16 | 7 | * 18 | -1 | * 20 | -1 | 2 | 9- 1 | \$ 54 | 9- | * 26 | 5 | * 28 | - 5 | # 30 | |
| # # | * | 1651 | 5634 | 24.1 | *0809 | 22.1 | 4884 | 8.1 | 9224 | 1.4. | 384# | 10- | 8654 | .90 | 3594 | 02- | 865 | 97. | 3794 | 93. | 106 | 88. | 28 | 83. | 0960 | |
| 5 | RPH | TORQU ftx1b | -5 | 7 | 1 | -122 | 9 | 7 | 9 | - | ~ | 7 | 1 | 7 | 1 | 7 | 8 | ĭ | - 9 | , | 6 | T | -104 | Ŧ | 7 | - |
| * * | * | | 4044 | 00. | 3066# | 8. | \$608 | 3 | 511# | : | 92# | | 564 | 2.1 | 450 | 11.1 | 434 | 3. | 7772# | 68.1 | 944 | 3.1 | 0 | | 621* | - |
| N. A | N O | TORQUE | -24 | 10 | -30 | 6 | -38 | 6 | 4 | 6 | -51 | 00 | -58 | | -65 | _ | -71 | | 11- | | -83 | • | -901 | 2 | - 9 | |
| * * | * | | # | | * | | ** | - | * | = | 4.2 | - | ** | - | \$. | | * | | 4. | - | 8 . | - | * | - | * | - |
| OTO | # RP. | TORQUE | 4861 | -345- | 5321. | -335. | 5674. | -323. | 6058. | -309. | 949 | -295. | 6882. | -280- | 731 | -265- | 7757. | -249. | 8207. | -233. | 8663. | 302.1 -217. | 9125. | -200. | 9591. | |
| 0 1 | # | == | 4 | • | | | | | * | • | * | - | | • | * | - | | - | | • | # | - | # | - | * | |
| *DUTER* INNER *DUTER *SPROK* MOTOR *MOTOR | RPM | | 2136.# 4868.1 | 425.1 | 2683.4 | 418.1 | 3330.* | + 06.1 | 3948.# | 393.1 | 4544.# 6462. | 379.1 | \$124.# | 364.1 | 5692.# 7315. | 349.1 | \$.0529 | 334.1 | 6801.* | 318.1 | 7345.# | 302 | 7884.4 | 286 | 8419.* | - |
| * * | | 1 | 4 | - | # | - | | - | 4 | - | * | - | | i | | - | | | | - | | - | | - | | |
| #SPROK# MOTOR #MOTOR | * RPM * | UROL | 102.# 232.# | -7172.18902.1 | 128.# 254.# | 1-7016-18750-1 | 159.# 271.# | 1-6758-18497-1 | 289. | 1-6479-18226-1 | 217.# 308.# | 1-6183. 7933. | 245.# 329.# | 1-5871.17628.1 | 272.4 349.4 | 1-5546.[7312.] | 298-# 370.# | 1-5216.16988. | 325.# 392.# | 1-4878.16658.1 | 351.# 414.# | 1-4537-16326-1 | 376.# 436.# | 1-4195-15994-1 | 402. 4 458.4 | |
| | | S T | # | - 8 | # | - 8 | 4 | - | | | * | - | | - | 4 | | | 91.9 | * | 91.1 | # | -16 | * | 5-15 | * | - |
| MAX #INNER | 4 | 0800 x1b | 102 | 1172 | 128 | 1016 | 159 | 6758. | 188.# 289 | 614 | 217 | 5183 | 245 | 5871.17 | 272 | 5548 | 298- | 5216 | 328 | 1878 | 351 | 1533 | 376.# | 1195 | 403 | - |
| 4 5 4 | | == | | - | | 1 | ** | 1-6 | | 9- | | Ĭ | | - | | 1 | * | Ī | | 1 | *0 | | | - | 27.0* | - |
| VEH | HOH | | 10.5\$ | • | 12.0# | | 13.3 | - | 15.0# | | 16.5# | | 18.0# | 1 | 19.5# | | 21.04 | | 22.5 | | 24.04 | | 25.54 | | 27. | - |

| GEAR LDADS AT MAXIMUM TURN CONDIT MAX #INNER #DUTER# INNER #DUTER # VEH #SPROK #SPROK# MOTOR #MOTOR # | NER #OU | ONDIT | ION INNER | #OUTER | RUN DA | DATE: | #OUTER # | 7-AUG-8 *INNER * C | -8514 R #0UTER # C | | #INNER | | *OUTER | #INNE | ~ | #OUTER | | #INER | | * F | #INNER | ** | DUTER | # # |
|---|---------------------|--------|--------------|------------------|---------|----------------------------|----------|--------------------------|--------------------------|---------|--------|--------|--------|------------|-----------|----------|---------|------------------------|--------|-------------------------------|---------|------------|--------|------|
| * | RPH & RPR | # | RPM | # RPH | # | * | M C | A 9 | # RP# | * | 20 20 | * | T d | * | # H d | 8 | * | 8 | | | # R P # | * | RPA | * |
| | que 170 16s ft | | TORQUE | TOR QU | - | TORQUE TORQUE ftx bs | ORQUEI | TORQUE | 1 | TORQUE | TORQUE | 1 | ORQUE | 17080 | D S | 110ROUE | UE IT | TORQUE TORQUE TORQUE | 1 TE | ORQUE!TORQUE! txlbs!ftxlbs | 110R | TORQUE IT | 1 6 × | QUE! |
| 28.5\$ 427.\$ 480.\$ 8950.\$10060.\$ | 8950-#10060-# | # 090 | -10229 | \$4-11497# | 32 | 54.4 3 | \$58. | -4282 | 4-4- | 813.4 | | * | ò | * | 179.# | 1325 | * | -1552 | Ţ. | .4-1744.4 | * | **0 | | **0 |
| 3520-15340-1 | 255-1 -168-1 | 168.1 | 49. | - | | -462.1 | 701.1 | 1054.1 | 1-1-15 | -1598. | 813 | - | -1234 | 34.1-1276. | 76.1 | 1935. | 5.1 | 5816 | 1.9 | -8822# | \$ 22 | 45.1- | 340 | 5.1 |
| 30.04 452.4 503.# 9 | 9478.410533.4 | 533.4 | -108314 | *-12037 * | | 3446.# 3 | 3830.# | -4535. | 0+05-#-5 | 40.4 | | **0 | 0 | # | 1249.4 | 1388 | # 8 | 1643 | * | -1826. | | **0 | | ** |
| 1.620 | 240-1 -152-1 | 152.1 | 44.1 | 1 -70.1 | | -419.1 | 659.1 | 9.5 | 5-1-1503 | 03.1 | 737 | 1.1-11 | 9 | -1-11 | 57.1 | 182 | -: | 5274 | - | -8538# | # 203 | 35.1- | 320 | 3.1 |
| 31.54 478.4 525.4 10003.411008.4-1 | 10003.#11008. | 008. | | 4324-12580# | # 3638 | * | 003.4- | -4786 | 1975-4-9 | 67.# | | **0 | 0 | * | 318.* | 1450 | -#-0 | 1134 | 1-#* | 908 | • | 0.0 | | 9.0 |
| | 225- -137- | 137.1 | 1.04 | 1 -99- 1 | 1 -377. | _ | 619.1 | 860 | 1-1-111. | 11. | 99 | 66.1-1 | 089 | -10 | .1-1041.1 | 17.08 | 1.0 | 4745 | - | -7789 | 18 | 31.1- | 3006 | - |
| 33.0¢ 502.¢ 548.¢ 10526.¢11485.¢-1 | 526.411485. | 4.85.4 | -12029#-1 | *-13125 | 4 3828 | 4 | 4176.# | -5036 | 5-4-54 | 95.# | | #*0 | | # 13 | 87.4 | 151 | 3.4- | 1825 | -#- | 991. | * | ** | | **0 |
| 4417.1 | | 122.1 | 36.1 | 1 -62. | 1 -336. | _ | 580.1 | 167 | 1-1322 | 22.1 | 592 | 2.1-1 | 1021. | 6- + | 28.1 | 1600. | 1.0 | 4233 | - | 729 | 8# 15 | 34-1- | 2817. | 13 |
| 34.5¢ 527.¢ 571.¢ 11047.¢11965.¢ | 047.#11 | 4-596 | -12625 | 2625#-13673# | * 4017. | * | 351.* | -5286 | 3-4-5725 | 25.# | | **0 | • | # 16 | 56.4 | 1576. | 6.4-1 | 1915 | 2-** | . +10 | | | | 4.0 |
| 1-2264-14132-1 | 197.1 -108.1 | 108.1 | 32. | 1 -58. | 1 -297 | - | 542.1 | 678 | 1-1-12 | 37.1 | | 523.1 | -955- | i _ | -820.1 | 1497 | | 3740. | ! _ | -6826 | 91 49 | 444.1 | -2635. | : |
| 36.04 552.4 594.4 11567.412446.4 | 567.#12 | -4.999 | -132194-1 | \$-14223 | 4 4206 | 4 | 526.# | -5534 | \$\$65-#* | \$5.4 | | **0 | 0 | # | \$24.# | 1640 | | -2002- | -#- | 2158. | | .0 | | **0 |
| _ | 184-1 | -94.1 | 28. | 1 -54.1 | 1 -260. | _ | 507.1 | 265 | . 1-11 | 55.1 | 4.5 | 57.1 | -892. | - | -717-1 | 139 | 1.6 | 3269.1 | | -6377# | 12 | 62.1-2 | 2461. | = |
| 37.54 577.¢ 617.¢ 12085.¢12928.¢ | 12085.#12928.# | 928.#- | -13810 | #-14775# | | 4394-# 4 | -4.101, | 578 | 19-4- | 86.# | | #*0 | • | # 15 | 92.# | 170 | ** | -2095 | * | 241 | * | #*0 | | 4.0 |
| 1-1706.13602.1 | 172.1 | -81.1 | 24. | 1 -50.1 | 1 -224. | _ | 473.1 | 511.1 | | -1078.1 | 39 | 94.1 | -832. | 1 -61 | 18. | 1305. | 2.5 | 2819.1 | - | \$1565 | 100 | 88.1- | 22 | 97.1 |
| 39.0¢ 602.¢ 640.¢ 12601.¢13412.¢ | 601.013 | 412.4 | -144014-1 | #-15328¢ | 4 4582 | * | 4877.4- | -6029 | . *-6417. | 17.\$ | | **0 | • | . 4 16 | 1660. | 1767 | 7-4-21 | 2184 | 84.4-2 | 325. | | | Ĭ | **0 |
| 1-1449-13360-1 | 160-1-69-1 | 1.69- | 20. | 19- 1 | -1 -18 | 1.06 | 441.1 | 436 | 34.1-1006. | 1.90 | 33 | 35.1 | -776.1 | 1 1 | 525.1 | 1217 | -: | 2394.1 | - | 555 | 6 40 | 24.1-21 | 214 | 42.1 |
| 40.5¢ 627.¢ 663.¢ 13127.¢13887.¢ | 127.413 | 887.4 | -15002#- | #-15871# | 417 | 3.4 | 5050.* | -6281 | .4-6645. | 4.5.4 | | #.0 | • | # 17 | 29.4 | 1830 | -**0 | 2276. | # | 2407. | * | | Ū | * 0 |
| 1-1123-13049-1 | 146.1 | -54.1 | 16.1 | 1 -42. | 1-1 | 1.13 | 1.00. | 336 | - | 912.1 | 52 | 59.1 | -704-1 | 1 | -407-1 | 1105.1 | 5.1 | 1855. | - | \$036# | 11 | 16.1-1 | 1944 | 1 7 |
| 42.0# 652.# 685.# 13657.#14358.# | 657.814 | 358.4- | 15607#-1 | *-16408 | 49 | 66.# 5 | -#-1275 | 65 | 34.4-68 | \$10.4 | | | 0.4 | # 119 | 99.4 | 1892 | 4 | 2368 | 4 | 2489. | | ** | Ū | |
| 1 -768-12710.1 | 1.621 | -37:1 | 11.1 | -38 | -1- | 01.1 | 356.1 | 230 | 30.1 -8 | -811.1 | 1.1 | 17.1 | -626.1 | 1 | -278.1 | 982 | 2.1 | 1269. | ! - | -4476 | 1 | 490-1-1 | 1728 | - |
| 43.5# 677.# 708.# 14186.#14829.# | 14186.#14 | 829.4- | 16212 | 4-16947 | # 51 | 5 ** 65 | 5392.4- | -6788 | **-7095. | 95.4 | | **0 | 0 | * 18 | 1869.# | 1954. | 1 | 2459. | 4 | 2571. | # | **0 | | |
| | - | -20-1 | 6.1 | -33 | - | 1.95 | 313.1 | 128.1 | 1-1- | 14.1 | 6 | 1.6 | -551. | , | -155. | 86 | 864.1 | 106 | - | 3941 | 2 # | 73.1-1 | 52 | 1:1 |
| 45.0¢ 702.¢ 730.¢ 14716.¢15300.¢ | 716.#15 | 300. | -16818 | 4-1748 | 5# 539 | 351.4 5 | 5564.4 | 4-7041 | .4-7320. | 20.4 | | **0 | 0 | # 19 | 1939.4 | 201 | 2016.#- | 2551 | * | 2652. | 4 | .0 | 0 | # |
| 1 -102.12077.1 | 1-66 | 1.5- | 1:1 | -29 | - | -13.1 | 273.1 | 31 | - | -622. | 7 | 24.1 | -480.1 | | -37.1 | 75 | 753.1 | 169.1 | 1 | -3432# | | 65.1-1325. | 132 | - |
| | | | | | | | | | - | A | | | | | | | | | | | | | | |

REVISION: 16-JUL-85 RUN DATE: 20-AUG-85:112 BY: RICK LEWIS; GEAR LOADS AT MAXIMUM TURN CONDITION

INPUT DATA:

GROSS VEHICLE WEIGHT, tons = 40.0 MAXIMUM VELOCITY, mph = 45.0 ENGINE GROSS HP. =1000.0 LOSS ENGINE HP. = 120.0

FRONTAL AREA, ft^2 = 68.3

TREAD WIDTH, in. = 109.8

TRACK LENGTH, in. = 183.1

TRACK PITCH, in. = 7.63

NUMBER OF SPROCKET TEETH = 11

ROLLING RESISTANCE, 1b per ton= 100.0

GRADE, % = 0.0 COEFFICIENT OF FRICTION = 0.70 MAXIMUM ACCELERATION, 9S =0.50 COEFICIENT OF DRAG = 1.00

TWIN DRIVE MOTOR SET-UP ALTERNATIVE Efficiency data for Mestinghouse induction motor # by Craig Joseph 10-MAY-85

TORQUE! TORQUE ftlbs # DUTER RPM ¥ ftlbsi # INNER RPM H TORQUE ftxlbs OUTER RPA ш H ftxlbs TORQUE INNER RPE ш # TORQUE ftxlbs DUTER 0 3) RPH ftxlbs TORQUE CED INNER RPM # TORQUE ftx1bs OUTER RPE # TORQUE ftxlbs INNER E P. 8 # TORQUE ftxlbs # MOTOR = OUTER RPM ₩ TORQUE # INNER # MOTOR=A RPH 让 ftxlbs TORQUE OUTER SPROK RPH ftxlbs TORQUE SPROK INNER RPM HAX # HDH H. A HUA

| #i | -71.4 | 11.4 | 1759. | 1758.# | -457.# | 4.754 | -126.# | .125.# | 329.# | -329.# | -71.* | 71. |
|----------------|----------|-------------|--------|---------|---------|--------|----------|---------|--------|------------------|------------------|--------|
| | -25777.1 | 25777.1 | 1306-1 | -1305.1 | -4349-1 | 4349.1 | -14616.1 | 14616.1 | 1395.1 | -1395-1 -22829-1 | -22829-1 | 22826. |
| 63 | # 69- | 86.* | 2134.# | 1201.* | -554-# | 312.# | -152.# | 86.4 | 399•# | -224.# | #*64- | 86. |
| - | -25450-1 | 25450.1 | 1289.1 | -1289.1 | -4294-1 | 4294-1 | -14431.1 | 14431-1 | 1377-1 | -1377.1 | -1377.1 -22540.1 | 22538. |
| 3.0≄ | 10.* | #*99 | 1627.4 | 240-# | -422. | -62.# | -116.≄ | -17.* | 304.* | 45. | 10.# | .99 |
| - | -19796-1 | 24248-1 | 1228-1 | -1002-1 | -4091.1 | 3340.1 | -13749.1 | 11225.1 | 1312.1 | -1071. | -1071.1 -17024.1 | 21982. |
| 4.54 | 17.4 | 96 ° | 2383.≄ | 417.4 | -619- | -108.* | -170.4 | -30°≉ | 446.* | 78.* | 17.* | -96 |
| - | -19710-1 | 24154.1 | 1224.1 | 1-866- | -4077-1 | 3325.1 | -13701.1 | 11176.1 | 1308.1 | -1067.1 | -1067.1 -16947.1 | 21908. |
| \$0 • 9 | 25.# | 126.* | 3118. | 615.4 | -810.# | -160.4 | -223.# | # • 44- | 583.≑ | 115.# | 25.# | 126. |
| - | -19634.1 | 24091.1 | 1220.1 | 1-966- | -4064-1 | 3313.1 | -13660.1 | 11133.1 | 1304-1 | -1063.1 | -1063.1 -16880.1 | 21844. |
| 7.5# | 39.# | 150. | 3705. | 962•≉ | -962.# | -250. | -264.# | #*69- | 692.≄ | 180.* | 39.# | 150. |
| - | -19405-1 | 23865.1 | 1209.1 | -982.1 | -4026-1 | 3274.1 | -13532.1 | 11003.1 | 1292. | -1050-1 | -1050.1 -16676.1 | 21644. |
| *0.6 | 57.* | 169.# | 4184. | 1416.4 | -1086.≄ | -368.* | -299.* | -101.* | 782. | 265.# | 57.# | 169. |
| - | -19057-1 | 23523.1 | 1191.1 | -965-1 | -3969-1 | 3215-1 | -13338-1 | 10806.1 | 1273.1 | -1031.1 | -1031-1 -16367-1 | 21341. |

| GEAR L MAX # VEH # | LOADS AT I | MAXIM # 0 | MAXIMUM TURN CONDITION # DUTER # INNER # SPROK # MOTOR=A | C * * | | ## | AUTER MOTOR=A | N * * | DATE:NO. | 20-1 | 20-AUG-85;112 0UTER # 8 # | 112 # IN # C | INNER | ** | OUTER C & D | ## | INNER | # # | DUTER | * * | INNER * | OUTER |
|--------------------------|------------|--------------|--|-------|------------|----|------------------|-------|--------------------|------|---------------------------------|--------------------|-------------|-------|----------------|----|------------------|-----|------------------|-----|------------------|--------|
| # HOH | A C | # | RPM | # | RPH | # | RPM | # | RPH # | | RPM # | * | T d. | # | RPH | ¥ | RPM | # | RPM | # | RPM | RPM |
| | TORQUE | | TORQUE | | TORQUE | | TORQUE | | TORQUE ftx1bs | == | TORQUE | 124 | TORQUE | | TORQUE | | TORQUE ftx1bs | | TORQUE ftx1bs | | TORQUE! ftlbs | TORQUE |
| 10.5# | 77. | # | 188. | # | 4635.# | # | 1898. | * | -1204.# | ж | -463-# | 4 | -331.# | # | -135 | # | 866.# | # | 355. | 45 | 17.* | 188 |
| - | -18572.1 | - | 23143. | _ | 1172. | - | -945. | - | -3905-1 | _ | 3150.1 | | -13123. | - | 10587- | | 1253. | - | -1011-1 | 1 | -16026.1 | 21006 |
| 12.0# | \$**L6 | # | 205. | # | 5072.# | # | 2395.# | # | -1317. | 34 | -622-# | * | -362.# | 4 | -171-# | # | **8*6 | # | 448. | * | \$ · 16 | 205 |
| - | -18254. | - | 22732. | - | 1151. | - | -924- | _ | -3835. | | 3080.1 | - | 12889. | | 10350. | _ | 1230.1 | - | -988-1 | • | -15655-1 | 20642 |
| 13.5# | 117. | # | 223. | # | 5515. | # | 2885 | # | -1432.# | H | -149.# | 44 | -394.# | 好 | -206. | # | 1031. | # | 539.# | # | 117.# | 223. |
| - | -17839-1 | - | 22324.1 | _ | 1131.1 | _ | -903-1 | _ | -3766-1 | _ | 3010.1 | | -12658. | _ | 10115. | - | 1208- | - | -996- | | -15286. | 20282 |
| 15.0# | 140 | ** | 237. | # | 5867. | # | 3467.# | # | -1524.# | 34 | **006- | # | -419.# | 44 | -241 | # | 1097. | # | 648. * | # | 140.4 | 237 |
| - | -17151-1 | - | 21645.1 | _ | 1096. | _ | -863- | _ | -3652.1 | _ | 2894. | | -12273.1 | | 9725.1 | _ | 11711-1 | - | -928- | | -14676-1 | 19682 |
| 16.5# | 164.# | # | 252. | 46 | 6224- | 44 | 4045. | # | -1516.# | 34 | -1050- | 24 | #-999- | 4 | -585- | # | 1163. | # | 756. | # | 164.* | 252 |
| - | -16372. | - | 20875. | _ | 1057. | - | -829. | _ | -3522.1 | _ | 2762. | | -11836. | _ | 9283.1 | - | 1130.1 | _ | -886- | | -13985. | 19001 |
| | 186.* | # | 267. | * | \$ ** 0099 | # | 4600. | 41 | -1714. | 24 | -1195.# | 4 | -471. | # | -328. | * | 1234. | # | 860.* | * | 186. | 267 |
| B-6 | -15554 | - | 20067- | - | 1016. | - | -787- | _ | -3386.1 | | 2624.1 | | 11378. | _ | 8819. | _ | 1086- | - | -842. | | -13260.1 | 18287 |
| 4 | 208 | # | 283.* | # | 0669 | # | 5144. | 44 | -1815.# | | -1336.# | 25. | **66 | * | -367.* | # | 1307.≎ | 45 | 961. | # | 208. | 283. |
| - | -14705 | - | 19229. | _ | 974.1 | _ | -745. | - | -3244.1 | _ | 2481.1 | _ | -10903. | _ | 8338 | - | 1041. | - | -196. | | -12507.1 | 17546 |
| 21.0# | 230.# | 46 | 299.# | # | 7390- | 46 | 5676. | 41 | -1919.# | 20 | -1474.# | 44 | -527. | 46 | +-405- | # | 1381. | ** | 1061. | # | 230. | 299. |
| - | -13834- | - | 18369. | _ | 930. | - | -700.1 | _ | -3099.1 | | 2334.1 | | -10415-1 | | 7844. | - | ->66 | - | -749.1 | ı | -11733. | 16786 |
| 22.5# | 251.* | # | 316.# | 48 | 7800-# | # | 6200. | 45 | -2026. | | -1610. | м | -557. | 4 | -443. | * | 1458.* | # | 1159. | 41: | 251. | 316 |
| - | -12946- | - | 17494- | - | 886.1 | _ | -655. | - | -2951.1 | | 2184.1 | | -9919- | _ | 7341. | _ | 947.1 | _ | -701.1 | | -1094601- | 15013 |
| 24.0* | 272.# | # | 333.≄ | # | 8217. | # | 6717. | * | -2134.# | u | -1744.# | 34 | -586. | 24. | #-614- | # | 1536. | # | 1256. | # | 272.# | 333. |
| - | -12051.1 | - | 16612. | _ | 841- | _ | -610-1 | _ | -2803-1 | | 2033.1 | | -9419. | _ | 6833.1 | _ | 899. | - | -652.1 |) | -10151-1 | 15233 |
| 25.5# | 292. | # | 350.# | # | 8639. | ¥ | 7227. | # | -2246. | | -1877. | 34 | -617. | . 24. | -516. | 삵 | 1615. | # | 1351.≉ | 45 | 292.# | 350. |
| - | -11155.1 | - | 15731. | _ | 1.797 | _ | -565. | _ | -2654.1 | | 1882.1 | _ | -8918- | _ | 6325. | _ | 851.1 | - | -604- | - | 9356. | 14454 |
| 27.0# | 313. | * | 367.# | # | 9067. | 45 | 7733. | # | -2355.# | | -2008. | | 647. | | -552. | # | 1695. | * | 1446.# | * | 313. | 367 |
| - | -10264.1 | - | 14856. | _ | 752. | _ | -520-1 | _ | -2506.1 | | 1732. | | -8423.1 | _ | 5820- | _ | 804-1 | - | -556- | | -8566. | 13681 |
| | | | | | | | | | | | | | | | | | | | | | • | |

| ## STACK FAILUREAL FAILUREAL B | ~ " | LOADS AT MA | MIMUM | URN R | | # - | ~ | | 2 | DUTER | # - | INNER | * * | OUTER # | | INNER # | | OUTER # | IN | 3 |
|--|---------|-------------|--------|----------|--------|--------|--------|----|--------------------|----------|------|--------|-----|--------------------|----|----------------|-----|---------|---------|------------|
| Name | ** | | | | | H | 11 | H | | æ | # | | | | | | н. | | L | L . |
| TORONIE TORO | | | | # | | * | RPM | # | | RPM | # | | # | | | | | | - 1 | R RPM |
| 1333.4 384.4 9498.4 8235.4 2467.4 2139.4 -678.4 -588.4 1775.4 1539.4 353 1353.4 462.4 9933.4 8733.4 2280.4 2286.4 -7935.1 5322.1 7771 -588.1 -7786.1 13150.1 666.1 -422.1 -2231.1 1438.1 -7456.1 4634.1 772.1 -561.1 -7022 353.4 420.4 10311.4 9229.4 -2639.4 -740.4 -659.4 1399.4 175.4 313.1 -681.1 -7658.1 12330.1 625.1 -389.1 -2280.4 -2297.4 -740.4 -659.4 1399.4 175.4 313.1 -687.1 -461.1 -762.0 -462.0 1399.4 175.4 -462.0 | | TORQUE | TORQUI | | TORQUE | | TORQUE | | TORQUE ftxlbs | TORQUE | - | TORQUE | | rokque ftx16s | 11 | TROUE Exibs | ## | RQUE 1 | TORQUE | TORQUE |
| 933.4 402.4 933.4 475.1 -236.1 1795.1 1795.1 1795.1 1795.1 1787.2 1867.4 1787.4 -623.4 1857.4 1837.4 1827.4 1837.4 | 28.5# | 333.4 | | *** | | * | 8235 | # | 2467 | | * | -678- | # | 588 | | 1775.4 | м. | 539 | | 384 |
| 1313.4 402.4 9933.4 8733.4 -2280.4 -2286.4 -7795.4 4834.4 712.1 -4611 -7022 -2526.1 4834.1 712.1 -4611 -7022 -2526.1 4834.1 712.1 -4611 -7022 -2526.1 4834.1 712.1 -4611 -7022 -2526.1 -2213.1 -2213.2 -2593.4 -2703.4 -2593.4 -2593.4 -2703.4 -2529.4 -2213.2 -2213.2 -2593.4 -2703.4 -2593.4 -2703.4 -2529.4 -2693.4 -2703.4 -2593.4 -2703.4 | - | 9386 | | 94.1 | 7.0 | 1-61 | -475. | - | 2361 | 1584 | ; | 7935 | - | 322 | | 757. | | 508. | -7786. | 12919 |
| 1.256.i 13150.i 666.i -432.i -2203.t -2397.t -740.t -659.t 1939.t 1725.t 3733.t -2203.t -2263.t -2 | 30.0€ | 353 | | 02.4 | 6 | 13.# | 8733. | # | -2580.# | | # | -401- | # | 623 | | 857 | J4. | 632. | | k 402 |
| 1933. 420.¢ 10311.\$ 9229.\$ -2693.\$ -140.\$ -659.\$ 1939.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1725.\$ 1627.\$< | - | 3526 | 1 | 50-1 | 99 | 1-9 | -432, | - | -2219.1 | 1438 | 1.8 | -7456. | _ | 4834-1 | | 712.1 | | -461.1 | -7022.1 | 12174 |
| 0.04 393.4 438.4 10812.4 9721.4 -6991.1 4399.1 667.1 -416.1 -416.1 0.04 393.4 438.4 10812.4 9721.4 -2505.4 -772.4 -694.4 2021.4 1817.4 393 1 -6877.1 11539.1 584.1 -348.1 -1947.1 1160.1 -6542.1 3900.1 625.1 -372.1 -5358 433.4 453.4 10278.1 -2652.4 -803.4 -779.4 2104.4 1909.4 413 -0098.1 10778.1 546.1 -309.1 -1818.1 1079.1 -6111.1 3457.1 563.1 -372.1 -370.2 -135.4 473.4 473.4 10700.4 -1308.4 -2779.4 -6111.1 3457.1 563.1 -372.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 -370.1 | 31.5# | 373.4 | | 20.≄ | 10 | 1.* | 9229. | 45 | 2693. | N | #-1 | -140- | # | 629 | | | JE. | 725. | 373.* | , 420° |
| .0# 393.# 438.# 10812.# 9721.# -2805.# -772.# -694.# 2021.# 1817.# 393.# 1 -6877.1 11539.1 564.1 -748.1 -1947.1 1160.1 -6542.1 3900.1 625.1 -372.1 -558 4 413.# 455.# 11255.# 10212.# -2923.# -2652.1 390.1 625.1 -372.1 558.1 6098.1 10778.1 546.1 -399.1 -1818.1 1079.4 -6111.1 3457.1 583.1 -330.1 -885.1 99 433.* 473.* 11700.* -1696.1 903.1 -5700.1 305.1 -730.* 433.4 1 -643.1 9365.1 477.1 -1696.1 903.1 -5700.1 305.1 -463.1 -531.1 -582.1 -400.1 -400.1 -501.4 -501.4 -531.1 -582.1 -500.1 -501.1 -400.1 -400.1 -400.1 -400.1 -400.1 -400.1 -400.1 -400.1 <td>-</td> <td>7688</td> <td></td> <td>30.1</td> <td>. 62</td> <td></td> <td>-389.</td> <td>-</td> <td>-2080-</td> <td>1297</td> <td>7:1</td> <td>-6991.</td> <td>_</td> <td>359</td> <td></td> <td>67.</td> <td></td> <td>416.</td> <td>-6278-1</td> <td>11450.</td> | - | 7688 | | 30.1 | . 62 | | -389. | - | -2080- | 1297 | 7:1 | -6991. | _ | 359 | | 67. | | 416. | -6278-1 | 11450. |
| 1 -6877.1 11539.1 584.1 -1947.1 1160.1 -6542.1 3900.1 625.1 -372.1 -5588.1 4 413.4 455.4 11255.4 10212.4 -2652.4 -803.4 -779.4 2104.4 1909.4 413 -6098.1 10778.1 546.1 -309.1 -1818.1 1079.4 -813.4 -779.4 2104.4 2100.4 433 -6098.1 10778.1 546.1 -309.1 -1818.1 1079.4 -330.1 -486 -6098.1 10778.2 10700.4 -303.4 -2779.4 -835.4 2187.1 230.1 -430.1 -5352.1 1005.3 277.1 -2905.4 -867.4 -778.4 277.4 -230.1 -4290.4 -4643.1 9365.1 474.1 -235.1 -1580.1 -780.1 -867.4 -780.4 -780.1 -871.4 -230.1 -4290.4 -4643.1 9365.1 474.1 -235.1 -4290.4 -863.2 -778.4 -778.4 < | 33.0* | 393.4 | | 38 | - | | 9721. | # | 2808 | 252 | 10 | -772. | * | +-694- | | 2021.4 | 34 | 1817. | 393.* | 438 |
| 413.** 455.** 11255.** 10212.** -2923.** -2652.** -803.** -779.** 2104.** 1999.** 1999.** 1999.** 1999.** 1999.** 433.** -778.** -815.** -764.** 2104.** 1999.** 433.** -764.** 2107.** -885.** -764.** 2181.** 2000.** 433 -5332.1 10633.1 509.1 -271.1 -1696.1 903.1 -5700.1 3035.1 544.1 -290.1 -4202. -5352.1 10633.1 509.1 -271.1 -1696.1 -809.* -764.* 2181.* 2000.* 433 -6443.1 9365.1 472.1 -235.1 -1580.1 783.1 -5700.1 3035.1 544.1 -290.1 -409.* -6443.1 9365.1 472.1 -235.1 -1671.1 -1471.1 -670.1 -498.* 2771.* 2711.* -271.* -271.* -271.* -271.* -271.* -271.* -271.* -271.* -271.* -271.* - | - | 6877 | | 39.1 | 58 | 4.1 | -348. | - | -1947. | 1160 | | -6542. | _ | 3900-1 | | 625.1 | | 372 | ' | 10751 |
| -6088.1 10778.1 546.1 -309.1 -1818.1 1029.1 -6111.1 3457.1 558.1 -330.1 -4858. -5352.1 10053.1 509.1 -271.1 -1696.1 903.1 -5700.1 3035.1 544.1 -290.1 -4202 -5352.1 10053.1 509.1 -271.1 -1696.1 903.1 -5700.1 3035.1 544.1 -290.1 -4202 -5463.1 9365.1 477.2 11187.4 -3154.4 -2905.4 -867.4 -798.4 2271.4 2001.4 453 -6463.1 9365.1 474.1 -235.1 -1360.1 783.1 -5310.1 2632.1 507.1 -251.1 -3572 -6463.1 8717.1 442.1 -201.1 -1471.1 670.1 -4942.1 2252.1 472.1 -251.1 -2973 -7340.1 8108.1 411.1 -169.1 -1368.1 563.1 -4597.1 1894.1 439.1 -181.1 -2413 -7464.1 546.4 13947.4 13120.4 -3505.4 -931.4 -991.4 2523.4 2523.4 510.1 -148.1 -2413 -7463.1 7015.1 362.1 -1111 -1183.1 371.1 -3977.1 1246.1 380.1 -1191 -1395 -756.1 550.4 550.4 583.4 14400.4 13600.4 -3522.4 -1028.4 -971.4 2692.4 2572.4 550 -768.1 550.4 550.4 233.1 -951.1 -186.1 -951.1 -995.1 -995.4 -936.4 2692.4 2572.4 550 -768.1 550.4 550.4 2350.4 -3522.4 -3602.4 -936.4 2692.4 2692.4 2572.4 550 -768.1 -1666.1 6529.1 331.1 -85.1 -1102.1 284.1 -3702.1 956.1 333.1 -91.1 -9 | * | 413.4 | | 55.4 | | ** | 10212. | # | 2923. | -2652 | 4 | -803- | # | -729.# | | 2104.4 | غد | -606 | | 4555 |
| 943.** 473.** 11700.** 10700.** -338.** -2779.** -835.** -764.** 2187.** 2000.** 433 -5352.1 10053.1 509.1 -271.1 -1696.1 903.1 -5700.1 3035.1 544.1 -290.1 -4520 -54 453.** 492.** 12147.** 11187.** -3154.** -2905.** -867.** -798.** 2271.** 2091.** 453 -643.1 9365.1 474.1 -235.1 -1580.1 783.1 -530.1 2637.1 -2901.** 453 -643.1 9365.1 474.1 -235.1 -1580.1 783.1 -689.** 2271.** 2091.** 472 -5 472.** -210.1 -1471.1 670.1 -4942.1 2521.** 472.1 -215.1 -257.** 492 -5 492.** 528.** 1236.** -3388.** -3157.** -931.** -688.** 2438.** 2271.** 492 -3 510.** 510.** | В | 8609- | | 78.1 | 5.4 | 6-1 | -309. | - | 1818 | 1029 | 1-6 | -6111. | - | 3457.1 | | 583.1 | | | -4865-1 | 10081 |
| -5352.1 10053.1 509.1 -271.1 -1696.1 903.1 -5700.1 3035.1 564.1 -290.1 -4202 -5463.1 9365.1 12147.* 11187.* -3154.* -2905.* -867.* -798.* 2271.* 2091.* 453 1 -4643.1 9365.1 474.1 -235.1 -1580.1 783.1 -5310.1 2632.1 507.1 -251.1 -3572 -0* 472.* 510.* 12595.* 11672.* -3271.* -3031.* -899.* -833.* 2354.* 2182.* 472 -1 -3972.1 8717.1 442.1 -201.1 -1471.1 670.1 -4942.1 2252.1 472.1 -251.1 -2975 -0* 492.* 528.* 13044.* 12156.* -388.* -3157.* -931.* -868.* 2438.* 2272.* 492 -0* 511.* 546.* 13495.* 12538.* -3565.* -963.* -963.* -902.* 2523.* 2362.* 511 -2749.1 7541.1 382.1 -139.1 -1272.1 464.1 -4276.1 1558.1 408.1 -149.1 -1886 | -65 | 433 | | 73.# | | *** | 10700. | # | 3038 | -2775 | | -835- | # | -164°# | | 2187.4 | | | | 473. |
| 0.\$ 453.** 492.** 12147.** 11187.** -3154.** -2905.** -867.** -798.** 2271.** 2091.** 4553.1 507.1 -251.1 -3572. 472.1 -255.1 -3572. 472.1 -251.1 -3572. 472.1 -251.1 -3572. 472.1 -251.1 -25 | | 5352 | | 53.1 | 50 | 1.6 | -271. | - | -1696-1 | 903 | | -5700. | _ | 035 | | 544. | | 290 | | 9441 |
| 1 -4643.1 9365.1 474.1 -235.1 -1580.1 783.1 -5310.1 2632.1 507.1 -251.1 -357.2 0.0 472.4 12595.4 11672.4 -3271.4 -3031.4 -893.4 2354.4 2182.4 472 1 -3972.1 8717.1 442.1 -201.1 -1471.1 670.1 -4942.1 2252.1 472.1 -215.1 -2975 .5 492.4 528.4 13044.4 12156.4 -3157.4 -931.4 -868.4 2438.4 2272.4 492 .5 511.4 5402.1 4942.1 1894.1 439.1 -215.1 -2513.4 5272.4 454.1 .0 511.4 540.4 -3157.4 -963.4 -902.4 2532.4 511.1 -181.1 -1272.1 464.1 -4276.1 1894.1 408.1 -149.1 -149.1 -149.1 -149.1 -149.1 -149.1 -149.1 -149.1 -149.1 -149.1 -149.1 -149.1 -149.1 | ** | 453 | | 92.4 | = | ¥.7. | 11187. | # | -3154. | -290 | • 1 | -867. | # | ±*861- | | 2271-4 | Je. | | | 492 |
| 0# 472.** 510.** 12595.** 11672.** -3271.** -899.** -833.** 2354.** 2182.** 472. 1 -3972.1 8717.1 442.1 -201.1 -1471.1 670.1 -4942.1 2252.1 472.1 -215.1 -2975. 54 492.* 528.** 13044.** 12156.** -3388.** -3157.** -931.** -868.** 2438.** 2272.** 492. 1 -3340.1 8108.1 411.1 -169.1 -1368.1 -4597.1 1894.1 439.1 -181.1 -2413 0 511.* 546.** 13495.* -3582.* -963.* -902.* 2523.* 2362.* 511.1 1 -2749.1 382.1 -139.1 -1272.1 464.1 -4276.1 1558.1 408.1 -149.1 -1886. 5 531.* 564.* 13347.* 13120.* -3622.* -3670.* 2632.* 2673.* 2672.* 5572.* 558.* 1 | | 643 | 6 | 55.1 | 14 | 1.4. | -235. | - | -1580.1 | 783 | 3.1 | -5310. | _ | 632 | | 507. | | | | 8834 |
| -3972. 8717. 442. -201. -1471. 670. -4942. 2252. 472. -215. -2975. 54 | 39.0# | 472.4 | | 10.4 | - | 5. | 11672. | # | 3271. | | * | 899 | # | 833 | | 2354.4 | 34 | 2182.# | 472.# | k. 510. |
| .54 492.* 528.* 13044.* 12156.* -3388.* -3157.* -931.* -868.* 2438.* 2528.* 2512.* 492.* -3340. 8108. 411. -169. -1368. 563. -4597. 1894. 439. -181. -2413 .0* 511.* 546.* 13495.* -3505.* -3282.* -963.* -902.* 2523.* 2362.* 511.* -2749. 7541. 382. -1272. 464. -4276. 1558. 408. -149. -1886 -2749. 7541. 382. -1322.* -3407.* -995.* -936.* 2607.* 2452.* 531 -2197. 7015. 355. -111. -1183. 371. -3977. 1246. -971.* 2592.* 5502.* 5502.* -3532.* -1028.* -1028.* -971.* 2592.* -91. -960.* -936. -936.* -936.* -936.* -936.* -936.* -936.* -936.* -936.* -936.* -936.* <td>-</td> <td>972</td> <td></td> <td>17.1</td> <td>7 7</td> <td>1-2</td> <td>-201</td> <td>-</td> <td></td> <td>92(</td> <td>0.1</td> <td></td> <td>-</td> <td>2252.1</td> <td></td> <td>472-</td> <td>_</td> <td>215.</td> <td>~</td> <td>8262</td> | - | 972 | | 17.1 | 7 7 | 1-2 | -201 | - | | 92(| 0.1 | | - | 2252.1 | | 472- | _ | 215. | ~ | 8262 |
| -3340. 8108. 411. -169. -1368. 563. -4597. 1894. 439. -181. -2413 -2749. 7541. 382. -139. -1272. 464. -4276. 1558. 408. -149. -149. -1886 -2197. 7015. 355. -111. -1183. 371. -3977. 1246. 380. -119. -119. -1395 -2197. 6529. 331. -856. -1102. 284. -3702. 956. 353. -91. -960. -96 | \$6.0\$ | 492.4 | | 28.# | 1 | # | 12156. | # | 3388 | | 4.7 | 931 | # | -868- | | 2438-1 | 34 | | | , 528. |
| 0# 511.** 546.** 13495.** 12538.** -3505.** -3282.** -963.** -902.** 2523.** 2362.** 511.** 1 -2749.** 7541.** 382.** -139.** -1272.** 464.** -4276.** 1558.** 408.** -149.** -1886 5\$ 531.** 564.** 13947.** 13120.** -3622.** -3407.** -995.** -936.** 2607.** 2452.** 531.** 1 -2197.** 7015.** 1350.** -3740.** -3957.** -1028.** -971.** 2692.** 2542.** 550.** 0* 550.** 550.** -956.** -971.** 956.** -971.** -940.** -940.** | - | | | 08.1 | 41 | 1-1 | -169. | - | -1368- | 99 | 3.1 | -4597 | _ | 1894-1 | | 439. | | -181.1 | 2 | 1726. |
| -2749. 7541. 382. -139. -1272. 464. -4276. 1558. 408. -149. -1 | 45.0# | 511.1 | | # 99 | - | \$. € | 2538 | # | m | - 3 | 2.4 | 963 | # | 905 | | 523 | Je. | 362- | | × 546. |
| 5\$ 531.* 564.* 13947.* 13120.* -3622.* -3407.* -995.* -936.* 2607.* 2452.* -2197. 7015. 355. -111. -1183. 371. -3977. 1246. 380. -119. -1 -1 -1 -1 -1 -1 -1 -1 | - | 2749 | | 41.1 | 36 | 15.1 | -139. | - | 1272. | 464 | | -4276- | _ | 558 | | 408- | _ | 6 | | 1226 |
| -2197. 7015. 355. -111. -1183. 371. -3977. 1246. 380. -119. -1 .0* 550.* 583.* 14400.* 13600.* -3740.* -3532.* -1028.* -971.* 2692.* 2542.* -1686. 6529. 331. -85. -1102. 284. -3702. 956. 353. -91. - | 43.5₩ | 531.4 | | \$ · *9 | 1 | 7.4 | | # | -3622. | m | 4.7 | 995 | * | +-936- | | 2607.1 | je. | 2 | 531. | * 564 |
| .0\$ 550.\$\pi\$ 583.\$\pi\$ 14400.\$\pi\$ 13600.\$\pi\$ -3740.\$\pi\$ -3532.\$\pi\$ -1028.\$\pi\$ -971.\$\pi\$ 2692.\$\pi\$ 2542.\$\pi\$ -1686.\$\pi\$ 6529.\$\pi\$ 331.\$\pi\$ -85.\$\pi\$ -1102.\$\pi\$ 284.\$\pi\$ -3702.\$\pi\$ 956.\$\pi\$ 353.\$\pi\$ -91.\$\pi\$ - | - | 2197 | 101 | 15.1 | 18. | 15.1 | -111. | - | -1183.1 | 37.1 | 1.1 | -3977. | _ | 1246. | | | _ | 119 | • | 6763 |
| 6529.] 331.] -85.] -1102.] 284.] -3702.] 956.] 353.] -91.] | 45.0# | 550.1 | | 83.4 | - | *** | | # | -3740.# | 1 | \$•2 | -1028. | # | -971.* | | 2692-1 | | 545 | 550.≉ | 583 |
| | - | -1686-1 | | 29.1 | 33 | 11.1 | -85. | - | -1102-1 | 284 | 4-1 | -3702. | _ | 956 | | 353. | _ | 91.1 | -940- | 6336 |

| RUN DATE: 15-AUG-87:113 电气电影器器建筑电影设置设置设置设置设置设置设置设置设置设置设置设置设置设置设置设置设置设置设置 | | | ossitatetetetetetetetetetetetetetetetetetet | * * * * * * * * * * * * * * * * * * * | # Hd | TORQUE TORQUE ftxlbs ftxlbs | -319.¢ | 11352 | 350.# | 111291 | 357. | 12460 | 364.# | 107901 | 369. | 96641 | 368.# | 95191 | 367.0 | |
|---|---|---|---|---|-------------------|--|---------------|-----------------|--------------|----------------|-----------|-----------------|--------------------|-----------------|------------------|-----------------|-------------------|---------------|-------------------|---------|
| *** | | | * | | # | 110 | # | _ | # | ! | | - | 1 | ! _ | * | _ | 4 | _ | 44 | - |
| | | | * | * | RPH | TOR QUE ftx1bs | 219 | 2966 | 338 | 29071 | 366.₽ | 2860 | 1394.* | 2819 | 1411. | 2524 | 408 | 2487 | 1406. | |
| | | | * | *** | # | III 80 | | 31 | * | 19 | | - | * | = | 0.4 1 | 19 | * | 15 | 0.4 1 | |
| | | | * | ** | M d | TORGU | 0 | -2403 | 0 | -2356 | 0 | -2317 | 0 | -22841 | 0 | -20461 | 0 | -2015 | 0 | |
| | | .50 | * | * * | 4 | B E | * | _ | | • | | ! _ | * | 1 | # | 3911 | * | 2 | # | - |
| | | 00 := | * | # I | 9 | TORQUE | 1964 | 094- | 2156 | -451 | .4-2200.4 | -443 | 2245. | -4371 | . 4-2274 | -39 | **-2269 | -38 | 4-2265 | - |
| | | * *0 * * | : | *** | # | | 6428.4-1964.4 | 5621 | 055.4-2156.4 | 5511 | # | 5421 | 348.4- | 5341 | | 181 | | 111 | | |
| | | FRICTION ATION 9 RAG # 1. | * | ###################################### | A P | TORQUE ftx1bs | 6428 | 56 | 7059 | 55 | 7201 | 35 | 1348 | 53 | 7441 | 1.5 | 7425 | | 7412 | 1 |
| | | GRADE, \$ * 0.0 CGEFFICIENT OF FRICTION MAXIMUM ACCELERATION. CGFICIENT OF DRAG * 1 PROPULSION MOTOR EFF.\$ | | * | * | JE IT | ** | 163 | **0 | 190 | 4.0 | 19 | **0 | 11. | **0 | = | | 12 | # | - |
| | | 0.0 ELER OF D MDTO | * | ###### #INNER # F | H | TOROUE | | 1932 | _ | 19096 | | 18876 | Ū | 186671 | ٠ | 15151 | 0 | 14907 | 0 | - |
| | | CIENT M ACCI | ****** | * * * | * | TORQUE TORQUE TORQUE ftx1bs ftx1bs ftx1bs | # 0 | 93291 | **0 | 88031 | **0 | 84041 | **0 | • | 4.0 | - | *.0 | 1115 | # 0 | |
| | | GRADE, T. ** COEFFICIENT MAXIMUM ACC COEFICIENT PROPULSION PROP. SYS.* | **** | ##### #OUTER | A H | TORQUE | | -193 | | -188 | | -184 | | 180 | - | -1178 | | 17 | ٠. | - |
| | | GRADE. CGEFFI MAXIMU CGEFIC PROPUL | **** | *** | * | D S I | 129.# | 2147 | # * | 1-11212 | **69 | 20971 | 34.4 | 20741-180771 | -2.4 | = | -40.8 | 16561- | 8.4 | |
| | | • | * * | ###### #INNER # E | 4 | TORQUE ftx1bs | | 21 | 104 | 21 | | 20 | | 20 | • | 168 | 1 | 16 | -78 | |
| | | 100. | ###################################### | *** | # | 1 bs | #*62 | -2147 | 4.61 | -20891 | -220. | -20441 | 51.4 | -20081 | -300. | 191 | -338°# | 9451 | -375. | |
| | | * 11 ton= | IVE | ***** ******************************** | RPH | el TORQU siftxib | -129 | | -179 | | | 1 | -261 | 1 | | -1976 | | 7 | | - |
| | | 8 · I | ********** ALTERNATIVE PROPULSION | * 24 | * | 90E | -258.4 | -6443 | -208. | 6365 | -138.4 | 12629 | -68. | -62221 | 3.4 | 040 | 19.4 | 1696 | \$ 95 | * * * * |
| | | 109.8 183.1 7.63 TEETH | ALTE PROP | ###### #INNER # D | # RPM | 10R | 2-4 | | 4 -2 | | | ' | # | • | | -5 | | 4-1 | - | |
| | | MIDIN, in. = 10 LENGTH, in. = 1 PITCH, in. = 7. R OF SPROKET TE 1G RESISTANCE, 1b SYS. GEAR RATIO | 8 | E | | 168 | 258.# | 64431 | 359. | 62671 | 440. | 6134 | 522. | 60251 | 601.4 | 929 | \$16.\$ | 837 | 100 | |
| | | In. In. EDCK | * ** | ###### #OUTER # D | # RP# | 1108 | 2 * | _ | 1 | | 1 | | | | 9 | 1 3 | | 2 | ~ | - |
| | | LENGTH, in. * LENGTH, in. * PITCH, in. * OF SPRDCKET IG RESISTANCE SYS. GEAR RA | Rotor | # & # # # # # # # # # # # # # # # # # # | RPH | ROUE K 1 b s | -376. | 3405 | -413. | -13142 | -421.\$ | 1262 | -430.* | 141 | -435 | 111 | -434.# | 1541 | -436.# | |
| | | ER DE | * 0 | ##### #INNER # C | * | 110 | 4 | 1-1 | | 1-1 | | 1-1 | | 1-1 | | 1-1 | | 1-1 | | - |
| | | TRACK LENGTH, in. = 1 TRACK LENGTH, in. = 7 TRACK PITCH, in. = 7 NUMBER OF SPROCKET T ROLLING RESISTANCE,1 STEER SYS. GEAR RATI | ************************************** | *00TER | # d | TORQUE TORQUE TORQUE TORQUE TORQUE TORQUE TORQUE TAIDS TAIDS TAIDS TAIDS TAIDS TAIDS | 376 | 134051-13405 | 413.4 | 13142 | 451.0 | 12921-12921 | 430.4 | 127411-127411 | 435.# | 11411-114111 | 436.4 | 115211-115411 | 434.4 | |
| | | | # PE | # 4 | | 11 s | | | 4 | | * | | | - | * | _ | * | _ | 3.4 | |
| | | 0.0 | 9#### ouse 1 -85 | #INNER | RP | tx1b | 982.4 | -1283 | 1321 | -1250 | 1587 | -1224 | 1853 | -1203 | 2110 | -1166 | 2351 | -1147 | 2593 | |
| | | 24 E | # # # # # # # # # # # # # # # # # # # | # # M | - | | * | 31 | _ ! | | _ ! | _ | _ ! | _ | ! | - | | _ | | |
| | | | tin 0-H | # B | E O. | URQ tx1 | -98 | 1283 | -834.1 | 1266 | -613.4 | 1250 | -392. | 1236 | -163.0 | 1019 | 83. | 1004 | 328.0 | |
| | | MEIGHT, tons IV, mph = 4: P. #1000.0 • # 120.0 ft^2 = 68.3 Fo = 92. | # # 40 10 40 | * * * | * RPH * RPH * RPH | UE III | 0.4 -982.4 | 0 | 398.4 | 161- | 197.# | -311 | | -391 | | 1191 | # . | 1751 | *** | - |
| •• | | E 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 1050 | PRO | 0. | ftxl | | | 39 | 1 | 19 | 1 | 119 | 1 | 159 | | 199 | 1 | 239 | |
| DATA | - | HP. | late for | *** | # | bs I | 65.8 | 121 | \$ 06 | 111 | 110.4 | 381 | **0 | 021 | 1.# 150.# 1593.# | 171 | 4.6 | 481 | # | ŧ |
| INPUT DATA: | | H VELOCI H VELOCI GROSS + NGINE HP L AREA. | # YO | SPRO | A P | TORG | - 1 | 251 | | 250 | | 245 | 13 | 241 | 15 | 237 | 16 | 233 | 18 | |
| - | Z | N N N N N N N N N N N N N N N N N N N | cten by | \$ K Z Z | | OUE I | +-69- | 1731 | -52.4 | 1791 | -35.4 | 1881 | -17.4 130.# 1195.# | 1066 | 1.* | 191 | 20.* 169.# 1991.# | 1916 | 39.# 188.# 2390.# | 1 |
| | | GROSS VEHICLE WEIGHT, to HAXIMUM VELOCITY, mph = ENGINE GROSS HP, = 10000.0 LOSS ENGINE HP, = 120.0 FRONTAL AREA, ft ² 2 = 68. | stotestststststststststststststststststs | estatesesesesesesesesesesesesesesesesese | MPH & RPH | TORQUE TORQUE TORQUE ftxlbs ftxlbs ftxlbs ftxlbs | | 1-257731 257721 | | 1-25462 25071 | | 1-251681 245381 | Ī | 1-248901 241021 | į | 1-201611 237171 | | -19876 23348 | | |
| | | J = 01 = 16 V1 | * | AX # | H H | | *0.0 | - | 1.54 | _ | 3.0# | - | 4.54 | - | \$0.9 | _ | 7.5# | - | 9.0* | - |

| TORQUE| TORQ -3721 -19441 23991 13911 . 22451 21611 0.¢ 1311.¢ 0.4 1147.0 1019.4 2072 19791 18841 1787 1688 1589 \$40.4 1490 × *.0 # -3601 -18841 -3351 -17511 # 0 0.0 4.0 9.0 **0 ..0 # .0 -2151 -11271 -18191 -15271 -14481 -13681 -12071 -16791 -16041 -12871 E O 7 # 0.* 6910.*-2111.* 6046.4-1847.4 0.# 5374.#-1642.# -3481 4837.4-1478.4 0.# 4397.#-1344.# -321 4031.4-1232.4 -3071 0.0 3721.4-1137.4 -2921 0.4 3455.4-1056.4 -2771 -985.# -2621 -924.4 -2461 -869. -231 I 455 1111 1603 2631 # 4251 393 357 3381 3011 375 0.# 3225.# 3201 2845.4 2821 3023.4 2687.# #INNER #STEER * F #MOTOR # RPM a • 0 **0 4.0 **0 ***** • 0 **0 97671 -97671 51011 -42871 -17001 14291-153051 128611 1364|-14732| 12277| 9517 -8517 4512 -3675 -1504 1225 -13536 110271 1697 969| -1107| 10845|-10845| 5631| -4794| -1877| 1598|-16893| 14383| 9381 -10741 105091-105091 54621 -46391 -18201 15461-163871 139191 14901-15858 134101 12954-14141 116631 80771 -80771 43071 -34571 -14351 11521-129211 103731 97081 90361 8364 # RPH **0 8551-104421 # 0 * 0 # .0 * 0 4.0 # "0 **0 **0 **0 #.0 **0 1004|-11676| 9291-110561 10781-122991 # RPM u. -232.4 -281.# -416.4 ****65*** -626.# 404.# -404.# 806.# 251.# -403.# -126.# -181.4 -327.# -372.4 -505--544.4 -585.4 **#INNER** RPH ш 52861 -44701 -17621 -4092| -1636| 47131 -38871 -15711 40991 -32361 -13661 38921 -30121 -12971 # 654.4 -504.4 919.4 -598.4 166.# -166.# 1398.# 1170.# -599.# 67341 -67341 36851 -27881 -12281 62901 -62901 34801 -25651 -11601 362.# -424.# 464.# -448.# #*995-189.4 -189.4 1263.4 1004.4 -631.4 -- 665.# -157.# 1468.# 1252.# -734.# 745.4 -534.4 -475.# RUN DATE:No. 15-AUG-85:113
#INNER #OUTER #INNER #DUTER
C # D # D # E # RPM # RPH 833. -177.# 1330.# 1087.# 561.* 202.4 -202.4 1196.4 847.# **896*** \$*056 257.¢ -257.¢ 1008.¢ 4910 1068.4 216.4 -218.4 1131.4 # RPH 93661 -93661 9041 -10391 101491-101491 89481 -89481 7631 -7631 71821 -71821 354.4 -354.4 314.4 -314.4 283.4 -283.¢ 236.4 -236.4 # RPM 157.* 177.# #OUTER # KPH U 648.# 2759.# 224.# 3585.# 1370.# 3012.# 8671 -10021 -8841 -7601 -7181 -6771 2871.4 237.# 3983.# 1695.# 3173.# 2006.4 3349.4 1996--924 283.4 5178.4 2596.4 3733.4 299.4 5576.4 2880.4 3935.4 -843 4144.4 -8011 4356.# 350.# 6771.# 3703.# 4572.# 4192.4 4779.# 2305.# 3537.# #DUTER # PROP #DUTER #INNER #SPROK #MOTOR # 8 # 8 * * 6151 5701 1461 8291 1881 703 316.4 5974.4 3158.4 689 5261 3186.# 1023.# 3433.4 367.4 7169.4 3971.4 # RPH # RPH 202.# 2788.# 165 1641 165 1681 181 1683 164 252.# 4381.# 1661 171 174 6373.4 1771 184 1-163691 1964:1 267.4 333.4 1-191771 225251 217. 1-185591 218501 1-178811 211441 1-147031 180481 1-13831 | 17228| 1-120491 155681 1-102621 139231 1-171481 204071 1-15551 188551 1-129441 163991 13.5# 116.# 63.# 18.04 186.# 22.54 251.4 27.0¢ 313.¢ 140.4 16.5# 164.# 208.4 21.04 230.4 \$0.0 GEAR LUADS A MAX #INNER # VEH #SPRUK # W WDW 15.04 12.00 10.5#

| * | VEH #SPROK # | #OUTER # PROP #OUTER #I #SPROK #MOTOR # 8 # | # PROP | # # B | ₩ ₩ ₩ | INNER B | 0 * * | 2 | Ž V | 2 # * | | A D A | * 6 | * * | E | # # 00 # | # # * | F | #STEE #HOTO | OR # | r | * * | * * | * | # # | ٠ |
|-------|--|--|---------------------|--------|-------------|------------|-----------|----------|----------------|----------|----------|--|------------|--------|----------------|----------|----------|--------|----------------|--------|---------|---------|----------|-----------------|-----------|--------|
| # Hdw | X a | # RP # | # RPM | * | # | M P M | * | * | RPH | # | RPH # | 8 | # RPH | # | 4 | * | R P M | a a | * | # | g G | * | * | RPR | * | # |
| == | TORQUE TORQUE TORQUE TORQUE TORQUE TORQUE | TORQUE | TOROU | FITOR | QUE I | | EITO SIFT | RQUE | 1080L ftx1b | S I ft | RQUE! | ORQUE TORQUE TORQ | el tos | 1 bs | TORGU ftx1b | # TTD | oue I | TORQUE | 1 === | tx16s | TORQUE! | JE TO | TORQUEIT | TORQUE TORQUE | EITO SITT | ROUE |
| 28.5# | 333.# | 386. | 384.# 7568.# 4236.# | * 45 | 36.4 | 5014 | # | 149.# | -149 | * | 538.4 | 1333. | - | #.69 | -667 | # | **0 | 0 | ¥ 254 | 4.9 | -778 | * | . 0 | 483 | # | 126.# |
| - | -93841 | -93841 131191 | 1881 | | 4831 | -6371 | | 58521 | -5852 | | 32791 | -23461 | | -10931 | 18 | - 178 | 16886 | 7038 | _ | 245 | -20 | 2001 -1 | 6501 | 1294 | - | 19567 |
| 30.0 | 353.# | | 402.4 7966.4 | ** | 4.98.4 | 5237 | 4 | 145.4 | -145 | # | \$.809 | 1414 | * | +***** | -107 | # | *** | 0 | .# 241 | 18.4 | -739 | * | | 459 | - #*6 | 120.# |
| - | -8524 | -8524 12334 | 1921 | | 1079 | 1965- | | 14245 | -54241 | | 30831 | -21311 | t | -1027 | 710 | 6- 10 | 10526 | 63931 | | 2271 | -1 | 198 | -9721 | 1200 | 10 | 19659 |
| 31.5# | 373.* | | 420.# 8364.# | | 4159.4 | 5463 | * | 135.# | -135 | * | £19.# | 1494 | # | -839.# | -747 | # | **0 | • | * 230 | 03. | -104 | * | 0.4 | 1 £ 3 1 | * | 114.4 |
| - | -76861 | -76861 115721 | 1961 | | 3991 | -5591 | | 50081 | -5008 | 1 | 28931 | -1921 | ' | 1996 | 10+9 | 8- 10 | 16191 | 5765 | | 2101 | -171 | _ | -8981 | 1108 | 18 | 42411 |
| 33.0# | 393.4 | | 438.# 8762.# | | 5019.* | 1695 | | 129.* | -129 | # | 1750.4 | 1574 | # | 875.# | -787 | # | **0 | ċ | .# 21 | 99.4 | -672 | * | | 417 | # | -109. |
| - | -68761 | -68761 108381 | 1661 | | 3591 | -522 | _ | 12094 | 12094- | | 27091 | -17191 | | -9031 | 5731 | | -81281 | 5157 | | 1931 | -15 | 581 | -825 | 10191 | 16 | 39011 |
| 34.5# | 413. | | 455.# 9161.# | | \$277.8 | 5919 | # | 123.# | -123.4 | - | 822.4 | 1653 | # | 911. | -826 | # | ** | 0 | .* 21 | 03.4 | -643 | * | *** | 399 | | -104.4 |
| - | -60961 | -60961 101334 | 1 2031 | | 3201 | -487 | _ | 42211 | -42211 | | 25331 | -155 | - | -8441 | 20 | 180 | 1009 | 4572 | 21 | 1771 | -1441 | | -1561 | 93 | 31 | 35741 |
| 36.0 | | | 473.4 9559.4 | | 5534.4 | 6149 | | 118.¢ | -118. | . 4 18 | \$. 468 | 1732 | 4 | 947.4 | -866 | # | 0.4 | 0 | # | 2015.4 | -616 | * | 0.8 | 382.4 | | 100. |
| - | -5351 | 12956 | 2 | | 1487 | -45 | 31 | 38521 | -38521 | | 23651 | -1337 | - 11 | 7881 | * | 51 -1 | 1960 | 4013 | 31 | 1611 | -13 | 12 | 1069- | 852 | 21 | 3262 |
| 37.54 | 453.4 | 4.264 | \$ 9957.\$ | | 5789. | 6381. | 4 | 113.0 | -113.4 | _ | **996 | 1811 | 6- 4. | 83.4 | -905 | * | **0 | | .# 19 | 35.4 | -591 | * | **0 | 367 | | #-96- |
| - | -46411 | | 1 2111 | | 1642 | -421 | _ | 35021 | -3502 | _ | 22061 | -1160 | _ | -7351 | 38 | 9- 19 | 1619 | 3481 | _ | 1461 | -12 | - | -6271 | 114 | - | 2966 |
| 39.04 | 472.4 | 1 | 510.010356.0 | 4 60 | 4-5509 | 6613 | 45 | 109.4 | 7 | 09.# 2 | 2039.* | 1889 | . #-101 | 19.4 | -945 | * | # 0 | • | .* 18 | **098 | -568 | | | 353. | | -92. |
| - | -39701 | 82271 | | | 2151 | -391 | _ | 31729 | -31721 | : | 20561 | -9921 | 1 | -6851 | 33 | 9- 10 | 1021 | 2978 | _ | 1331 | -108 | _ | -5681 | 101 | = | 26861 |
| +0.54 | 492.# | 1 | 528. #10754.# | | £588. | 6845 | | 105.* | -105. | - 1 | 2112.* | 1968 | 4-1 | 056.4 | -984 | * | **0 | 0 | . 17 | 91.4 | -541 | * | **0 | 340 | * | **68- |
| _ | -33391 | 7665 | 2181 | | 184 | -36 | 3.1 | 28621 | -28621 | | 19161 | -8341 | ' | 6381 | 7.2 | | 57481 | 2504 | _ | 1201 | 6 | - 8 | -5131 | 633 | _ | 24231 |
| 45.0# | \$11.0 | 1 | 546.#11152.# | | 6551.0 | 7079. | 4 | 101.* | -101 | . 21 | 185.4 | 2046 | #-1 | 092.4- | -1023 | | ** | | # | 727. | -528 | * | | 328 | | -86. |
| - | -27481 | 11411 | 1122 | | 1551 | -336 | _ | 25721 | -2572 | _ | 17851 | -6871 | ' | 1565 | 22 | 6- 16 | 1956 | 2061 | | 101 | 8 | -881 | -4611 | 36 | 169 | 2178 |
| 43.54 | 531.4 | | 564.#11550.# | | 6804.4 | 7313 | 4 | 98.# | -98- | 2 | 258.# | 21 | 24.#-1129. | 29.4-1 | 062 | * | **0 | 0 | # 16 | 4.89 | -510 | * | | 316 | | -83. |
| - | -21961 | 19599 | 1 2241 | | 1281 | -31 | 2.1 | 23021 | -23021 | | 16641 | -549 | _ | -5541 | 8 | 31 | 1266 | 1647 | _ | 196 | 61- | 16 | 4121 | 20 | 16 | 19491 |
| 40.54 | \$50.# | | 583.#11949.¢ 7056.¢ | . 4 70 | \$. 95 | 7548 | * | 4.46 | -94 | . 4 2 | 331.4 | 2201 | -t-116 | 65.4-1 | 101 | * | **0 | 0 | 4 16 | 12.4 | -493 | * | | 306 | | -80° |
| - | -16851 | 62091 | 1 2281 | | 103 | -28 | 16 | 20531 | -20531 | 1 | 15521 | -421 | ' | 5171 | 1401 | *- IO | 6561 | 1264 | - | 198 | -70 | ١_ | -3681 | 454 | | 1738 |

stessesptessestes |-18891|23357| 1115-1 -902-1 263-1 -225-1-2480-| 3066-1 5654-1-6991-1 4365-1-5397-1-6845-1 8463-|31212-1-38589|12047-1-14894| ||FORQUE||TORQU||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORQUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGUE||TORGU 359. | -359. | -3383. | 3383. | 7714. | -7714. | 5955. | -5955. | -9338. | 9338. | 42582. | -42582116435. | -16435 354.1 -354.1-3338.1 3338.1 7612.1-7612.1 5876.1-5876.1-9214.1 9214.142016.1-42015116217.1-162161 275.| -337.|-2594.| 3179.| 5915.|-7247.| 4566.|-5594.|-7160.| 8773.|32651.|-40005|12602.|-15440| 1152. | -939. | 274. | -336. | -2583. | 3167. | 5889. | -7222. | 4546. | -5575. | -1129. | 8742. | 32507. | -39864 | 12546. | -15386 | 273. | -335. | -2573. | 3158. | 5867. | -7201. | 4529. | -5559. | -7102. | 8717. | 32387. | -39750 | 12500. | -15342 | 269.1 -331.1-2534.1 3119.1 5777.1-7112.1 4459.1-5490.1-6993.1 8609.131889.1-39258112308.1-15152 A STATE STAT # 0 **0 **0 -458.4 0.4 -186.4 186.4 244.4 -245.4 A RPA 165.4 -37.4 4.46-406.# -152.# GRADE, % * 0.0 COEFFICIENT OF FRICTION * 0.70 MAXIMUM ACCELERATION, 9\$ *0.50 COEFICIENT OF DRAG = 1.00 # RPH 229.# 28.¢ 180.¢ 264.# 346.# # RPR 0.4 115.# 0.4 -125.4 71.4 0.4 169.4 # 69 # RPH **0 **0 # 0 REVISION: 16-JUL-85 RUN DATE: 15-AUG-85:111 # RPH # RPH # RPH # RPH # RPH **0 **0 **0 THIN DRIVE MOTOR SET-UP **0 **0 **0 ** RULLING RESISTANCE, 1b per ton= 100.0 CONFIGURATION I 467.# 1260.# -614.#-1657.# -67.* 67.¢ -1410.¢ 1411.¢ 1611¢ -1612¢ -513.¢ 513.¢ 675.¢ -675.¢ 454.4 -833.4 78.# 497.# -103.# -654.# 129.# -177.# -959.# 955.4 -258.4-1256.4 876.# 3080.# -1001# -3520# 319.# 1120.# -419.#-1474.# NUMBER OF SPROCKET TEETH = 11 TREAD WIDTH, in. = 109.8 TRACK LENGTH, in. = 183.1 TRACK PITCH, in. = 7.63 BY: RICK LEWIS; 633.4 10844 -19884 -345.4 -617# -2999# 196.# -422# -2289# 135.# # RPH -246# -1562# -1466# -3958# Efficiency data for Homopolar motor MPH & RPH & RPH & RPH & RPH & RPH & RPH 40.0 GEAR LOADS AT MAXIMUM TURN CONDITION by Gene Stedler 20-MAY-85 1-25773|25773| 1230.i-1230.l 1149.1 -936.1 1134. | -921. | 1284.4 3464.4 -949.# 1740.# 1-254301254301 1214-1-1214-1 1156.1 -943.1 540.# 2625.# GROSS VEHICLE WEIGHT, tons # MAXIMUM VELOCY V, mph * 45.0 ENGINE GROSS HP. #1000.0 216.0 1367.0 370.4 2004.4 FRONTAL AREA, ft.2 = 68.3 LOSS ENGINE HP. * 120.0 INPUT DATA: 83.4 1-19675[24128] T.54 42.* 147.* 1-193011237611 3.0* 10.# 65.# 1-19762|24213| 26.8 125.4 1-196021240591 -45.# *0.9 *0.0

| GEAR LOADS AT MAXI 4AX #INNER #OUTER# VEH #SPROK #SPROK# | AT MAXIMUM TURN COND #OUTER# INNER #OUTER #SPROK# MOTOR #MOTOR | = | # INNE | R #00T | æ | RUN DI | | #00TER # 8 | 15-AUG- #INNER | ER-83 | #00TER # C | Z | NER & | OUTE | # # | RNER | #001 | FER | * * | INNER | *00TE | ~ | #INNER | #0UT | G |
|--|--|----------|--------|------------|---------------|-------------|---------|--------------------------------------|-------------------|------------|----------------------------|--------|-----------|--------------|--------|----------------|------|------------------|--------|---------|----------|------------|--------------|----------|--------|
| MPH & RPH # RPH # | a a | # RPM | 4 | * | * | RPM | * | RPR | * | * | RPH | # RPM | * | RPM | * | E G | * | RPH | * | NO N | # RPH | * | 4 | * | X |
| TORQUE TORQUE TORQUE TORQUE | TORQUE ftx1bs | TORQUE | TORQU | UE IT | X 100 | TORQUE | UE TI | Elforqueitorquei siftxibsiftxibsi | | 165 11 | TORQUE TORQUE ftx 1 bs | | TOROUE! | TORQUE | | OROU tx1b | - S | TORQUE ftx1bs | | TORQUE! | t t | M N | TORQUE | == | TORQU |
| 10.54 82.4 183.4 | # 1712.# 3826. | | # -19 | *95 | -4373# | 62 | * | 1391. | * -81 | 0 | .4-1831. | * | * 0 | | * | 226 | * | 504. | * | \$-162 | + -663 | 3.4 | • | * | 0 |
| 1-184271228981 | 1 . 1093-1 -880 | -880. | 1 257 | - 1-15 | 319 | .1-2419. | • | 3006.1 | • | 16.1- | 5516.1-6854. | .1 42 | 58 | .1-529 | 91.1- | 1-6677 | 8 - | 1297.1 | 1304 | 30446. | | -378321117 | 1751 | 51.1-1 | 4602 |
| 12.04 102.4 200.4 | ¢ 2137.¢ | 4193. | \$ -24 | - \$2992- | -41614 | 111 | # | 1525. | *-102 | | #-2006. | # | ** | | **0 | 282 | 4 | 552. | 4 | 371. | 4 -727 | 1.4 | 0 | 4 | 0 |
| 1-179551224331 | 1 1071.1 -857 | -857. | 1 25 | - 1-057 | 312.1 | -2357 | - | 2945. | _ | 5374.1- | -6714. | 11 414 | 9.1 | -518 | 3.1 | -65069- | - | 8128- | 129 | .999 | 1-370 | 37063 114 | 1450 | | 4305 |
| 13.54 123.4 217.4 | 2566.0 4555 | 4555. | ¢ -29 | 932# - | \$202¢ | 93 | 3.4 | 1656.4 | 4-1228 | 28.4- | -2119. | 4 | 0.4 | | 4.0 | 338 | * | .009 | 4 | **5* | 4 -790 | ** | • | * | 0 |
| 1-17452[21937] | 1 1047.1 -833 | -833. | 1 243 | - - | (m) | 05.1-2291.1 | • | 2880.1 | 1 | -1-5225 | -6566. | - | 032.1 | -1-506 | 9.1 | -6323 | - | 948 | - | 28835.1 | 1-3624 | | 111129 | - | 398 |
| 15.04 143.8 234.4 | 300 | 4908- | # -34 | -34334 - | -5608* | 1093. | | 1785. | 4-1 | 438.4- | -2348. | * | 0.4 | | **0 | 396. | | 647. | 4 | 521. | 8- 4 | \$1.4 | • | | 0 |
| 1-16890 21383 | 1 1021.1 -806 | -806- | 1 23 | 35.1 - | 298 | 1-2217 | - | 2807. | .1 50 | 5055-1- | -6400.1 | m | -1-206 | 6 | 41.1- | -6120 | - | 7748-1 | N | 1905. | -35 | 1621 | 329110771.1 | 1 | 363 |
| 16.5# 164.# 251.# | 3442.4 | 5262- | 4 -39 | 3933# - | -6013# | 1252 | * | 1913. | .4-1647. | 17.0 | .4-2517. | * | **0 | | * | 453 | 3.# | 693. | * | \$97. | * -912. | 12.4 | • | 4.0 | 0 |
| 1-16297[20800] | 993-1 -778 | -178. | 1 22 | 227.1 - | -290.1-2139.1 | -213 | 1 | 2731. | .1 487 | 78.1- | 4878-1-6226-1 | 1 37 | 165.1- | | 806-1- | -5905- | 1 | 536-12 | 1269 | 6926.1 | 1 1 | 34365[10 | 0393.1 | 1 | -13263 |
| 18.00 186.# 267.4 | \$.3900.# | 5595. | * - 4 | - #9599 | **669- | 1418. | 4 | 2035. | #-18 | -#-99 | 2677 | * | 4-0 | | #.0 | 514 | | 737. | 9- #- | -676. | -910. | * 0 | 0 | **0 | 0 |
| 1-155511200641 | 1 958-1 -742 | -742. | 1 21 | - 1-112 | -279.1-2042.1 | -204 | • | 2634-1 | 1 | 55.1- | 4655-1-6005. | .1 35 | 593.1-463 | -463 | -1-9 | 6.1-5635 | - | 7270.1 | IN | 5695 | 1-33150 | 105 | 9917.1 | - | -12794 |
| 19.54 208.# 283.# | # 4360.# | \$926. | 69- \$ | - *8869- | -6772# | 1586. | * | 2155. | *-20 | 86.#- | *-2086.*-2835. | | 0.4 | | | 575. | | 781. | F- #. | -756.4 | .4-1027 | 4.1 | • | **0 | 0 |
| 1-14703 19226 | 1 918-1 -702 | -702. | 1 20 | - 1.502 | -268.1-1930. | -193 | • | 2524.1 | • | 01.1- | 4401.1-5755. | - | 3397.1 | +++ | 2.1- | -4442.1-5327.1 | • | 6966-124292 | 1242 | 192. | .1-31766 | 199 | 9376-1-12260 | Ξ | 528 |
| 21.0# 230.# 299.# | 4.612.4 | 6265.1 | * -54 | - 46695 | -7160 | 1750.4 | | 2278. | 4 | 02.4- | 2302.4-2998. | | 4.0 | 9 | **0 | 634 | | 825. | 4 | 834.1 | -#-1086 | 4.9 | • | **0 | 0 |
| 1-13831 18366 | 877-1 -660 | -660- | 1 19 | 193.1 - | -256.1-1 | -181 | 816.1 2 | 2411.1 | | -1.01 | 4140.1-5497. | -1 31 | 3196.1 | -4244.1-5011 | +:- | 5011 | 9 | 6655.122852 | 1228 | 1.258 | -30345 | 145 | 8820.1 | 1-1- | 1712 |
| 22.50 251.0 316.0 | \$ 5256.# 6612. | 6612. | 09- * | - #9009 | -1557# | 1911 | 4 | 2405. | . *-251 | 3. | -3164 | * | **0 | | ** | 692 | 4 | 871. | 4. | -911.4 | 4-114 | 46.8 | • | # 0 | 0 |
| 1-12944 17492 | 1.888 | -618. | 18 | - 1.08 | -244. | .1-1699. | - | 2296. | 1 3874 | - | -5236. | .1 29 | 991.1 | . -4041 | 7 | -6699- | _ | 6338. | . 1213 | 386. | 1-28900 | 100 | 8254-1-11 | 1 | 1154 |
| 24.0# 272.# 333.# | \$ 5694.\$ | .9969 | \$ -65 | - \$1059 | -7960 | 2071 | | 2533. | 4-27 | 24.4- | 333 | 3.4 | **0 | | **0 | 750.4 | | 918. | 6- | 87.8 | 1-1208 | | 0 | **0 | 0 |
| 1-120491166101 | 1 793.1 -575. | -575- | 1 16 | - 1-89 | -231.1 | -1585 | - | 2181. | - | 3606.1-497 | -4972. | - | 2784.1- | -3838-1 | | -4366- | - | 6018. | 119907 | 07. | -2744 | 431 | 7683 | - | -10592 |
| 25.5# 292.# 350.# | * 6127.# 7324. | 7324. | * -70 | - #200 | 8370 | 2228 | | 2663. | .4-293 | 932.4- | -3504 | * | * | | **0 | 807 | * | 965. | .*-10 | 1062. | - 1 | 1270.4 | 0 | **0 | 0 |
| 1-11153[15729] | - | -532. | 1 15 | - 1.55 | -219.1 | -1464 | - | 2065. | 1 33 | 38.1 | -4708 | -1 25 | 2577.1 | -36 | 34-1- | -4041 | - | 5699. | = | 8427.1 | -25 | 9871 | 7112 | -1-10030 | 003 |
| 27.0* 313.4 367.4 | | 7686. | 11- ¢ | +85# - | 8784 | 2384 | * | 2795. | .#-313 | 37.4- | 3678 | | 0.4 | | **0 | 864 | * | 1013. | .4-11 | 137.# | -13 | 32.# | 0 | 9.0 | 0 |
| 1-102621148541 | 1 709.1 -490. | -490. | 1 14 | 43.1 - | -207-1 | -1347 | - | 1950.1 | 4 | 12.1- | 3072-1-4446-1 | • | 2371.1 | -3432.1 | 2.1-3 | 7.18 | -1.5 | 382 | .1169 | 26 | -1-245 | 45411 | 6544 | - | 9472 |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

.0 **0 **0 -84.1 -159.1 795.1 363.1-1812.1 280.1-1399.1 -439.1 2194.1 2004.1-100041 773.1 -38611 -47821 772.1-1873.1-1210.1 2938.1 5517.1-133951 2129.1 -51701 | TORQUE|TORQUITORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|T 447. - -222. 65. 1 - 130. 1 - 609. 1 1229. 1 1389. 1 - 2803. 1 1072. 1 - 2164. 1 - 1682. 1 3393. 1 7669. 1 - 15471 | 2960. 1 - 5971 -5557 131.1 -195.1-1232.1 1837.1 2809.1-4188.1 2168.1-3233.1-3400.1 5070.115505.1-231171 5995.1 -89221 119. | -183. | -1119. | 1726. | 2551. | -3936. | 1970. | -3038. | -3089. | 4764. | 14084. | -21724 | 5436. | -8384 | 589.i -367.i 107.i -172.i-1009.i 1619.i 2301.i-3690.i 1776.i-2849.i-2785.i 4467.i12700.i-20369i 4902.i -7862! 96. | -161. | -903. | 1515. | 2058. | -3453. | 1589. | -266. | -2491. | 4180. | 11361. | -19061 | 4385. | -7357 -6872 75. | -140. | -702. | 1320. | 1602. | -3009. | 1236. | -2323. | -1939. | 3642. | 8841. | -16608 | 3412. | -6410 | #OUTER #INNER #OUTER # F # G # G # RPH # 0 #*0 .. 4.0 626.1-1733.1 -981.1 2718.1 4474.1-123911 1727.1 **0 **0 3888.1 2532.1 449.1-1562.1 -704.1 2450.1 3212.1-111711 1240.1 # .0 * 898 85. | -150. | -800. | 1415. | 1825. | -3226. | 1409. | -2490. | -2209. | 3905. | 10073. | -17806 | 0.# 1195.# 1307.#-1573.#-1719.# 0.¢ 1249.¢ 1357.¢-1644.¢-1785.¢ 0.# 1304.# 1407.#-1715.#-1851.# 917.1-2014.1-1439.1 3158.1 6560.1-144001 0.# 1358.# 1457.#-1786.#-1917.# 0.# 1412.# 1507.#-1858.#-1983.# 0.# 1467.# 1556.#-1930.#-2048.# 0.# 1522.# 1605.#-2003.#-2112.# 920.* 1061.#-1210.#-1396.# 0.¢ 1086.* 1208.¢-1429.¢-1589.¢ 0.# 1141.# 1257.#-1501.#-1654.# 975.# 1109.#-1283.#-1460.# 0.4 1031.4 1158.4-1356.4-1524.4 # RPM GEAR LDADS AT MAXIMUM TURN CONDITION
RAX WINNER COUTER COUTER COUTER COUTER COUTER COUTER COUTER COUTER COUTER
MAX WINNER COUTER # RPH # RPE # RPM **0 #.0 **0 **0 **0 4.0 4.0 #.0 **0 **0 **0 **0 **0 **0 55.1 -121.1 -521.1 1144.1 1188.1-2609.1 11552.#12185.#-13201#-13926# 4201.# 4431.#-5527.#-5830.# 9071.¢ 9919.¢-10366¢-11335¢ 3299.¢ 3607.¢-4340.¢-4746.¢ 9483.410297.4-108384-117684 3449.4 3744.4-4538.4-4927.4 9895.#10677.#-11308#-12202# 3598.# 3883.#-4734.#-5109.# 10305.#11058.#-11776#-12638# 3747.# 4021.#-4931.#-5291.# 46.1 -113.1 -438.1 1064.1 999.1-2427.1 512.4 546.4 10716.411439.4-122464-130724 3897.4 4160.4-5127.4-5473.4 985.1 811.1-2245.1 4295.4-5327.4-5652.4 888.1 582.1-2024.1 -89414-10048¢ 2845.¢ 3197.¢-3743.¢-4207.¢ -94184-10475# 2997.# 3333.#-3943.#-4386.# 6981. # 8052. # -7978 # -9202 # 2539. # 2928. #-3340. #-3853. # -96234 2692.4 3062.4-3542.4-4029.4 -98934-109044 3148.# 3470.4-4142.#-4565.# 36.1 -104.1 -356.1 11134.411812.4-127244-134994 4049.4 -94.1 -255.1 27.1 17.1 -8461# # RPH 668.1 -448.1 387.1 -159.1 358.1 -129.1 289. | -58. 7404.# 8421.# 628-1 -407-1 7823.# 8792.# 8241. \$ 9166.\$ 551.1 -328.1 8657.# 9541.# 480.1 -255.1 416.1 -190.1 -93.1 -291.1 # RPH 514.1 323.1 1-12121 60551 531.4 564.4 433.4 473.4 453.4 492.4 472.4 510.4 528.¢ -33391 81071 1-19441 67611 373.4 420.4 -5351[10052] -46411 93641 -27081 75001 333.4 384.4 -93841139921 353.4 402.4 393.# 438.# -68761115378 413.4 455.4 -60961107771 -39701 87151 -8524 | 131481 -76861123291 # RPM \$0.66 28.54 30.04 33.04 34.54 37.54 62.0¢ 31.5* HOM

B.2.E Maximum Power Gear Loads And Speeds

These tables are identical to those of Appendix Section B.2.D except that they are for the full range of specified speed vs tractive effort. Refer to Section B.2.D if a detailed explanation of the data sheets is needed.

RUN DATE: 20-AUG-85:8

INPUT DATA:

ENGINE NET HP. = 440.0 45.0 MAXIMUM VELOCITY, mph. = 45.1 NUMBER OF SPROCKET TEETH = 11 VEHICLE WEIGHT, tons = 19.5 TRACK PITCH, in. = 6.03

THIN DRIVE MOTOR SET-UP CONFIGURATION # # Efficiency data for Westinghouse induction motor by Craig Joseph 10-MAY-85

68 96 24. 2357. 72. 119. 818. 143. 697. 1791. 1282. 1001 ftlbs TORQUE # DUTER RPM u. 4 24.4 \$ · 96 48°# 72.4 2355.1 1789.1 10001 119.4 143.4 1-969 818. 1281. ftlbs TORQUE # INNER RPK L # 110.# 221. # 331.* 40194 552.4 662. # 330.1 1115.1 847.1 506-1 473.1 387.1 TORQUE ftxlbs DUTER RPM w 44 110.4 221.4 331.4 441.4 552°# **662.** # 1115.1 847.1 1.909 387. 330.1 TORQUE ftxlbs INNER RPH w # -45.4 -126.# -168.4 -211.* -253.# -3452.1 # - 58 --6351. -4055.1 -11678.1 -3871. -4959.1 ftxlbs TORQUE OUTER C & D RPH # -45°# -126.4 -84.* -211.4 -253. -6351.1 -168.4 -11678.1 -8871.1 -4959-1 -4055.1 -3452. ftxlbs TORQUE INNER C & D RPH ¥ -153. # ±-095--613.# -766.# -306. -2640.1 -919.4 -1027.1 -3475-1 -1890.1 -1476--1206-1 ftxlbs TORQUE OUTER RPI œ # Ħ -153.# -306-# **-460.** -613. -766.# -919.# -1027-1 -3475-1 -2640-1 -1890.1 -1476. -1206-1 TORQUE ftxlbs INNER RPH മ 44 # 500°# 4.666 1043. 1499.# 1999.4 2499.# 2998.* 567. 643.1 362. 308-1 792. TORQUE ftxlbs # MOTOR=A OUTER RPR # \$00°# ******666 1499. 567.1 1999.4 2489.# 362.1 2998.# 1043-1 443-1 792. 308. TORQUE # MOTOR=A # INNER E d 44 24.4 # 8 4 72.4 # 96 20596.1 119.4 143.4 15646. 11201. 8746. 7151. 6088.1 TORQUE ftxlbs **SPROK** RPA # 24.4 48.4 4.96 72.4 119.4 143.4 20596-1 15646-11201. 8746-1 7151. 6088-1 ftxlbs TORQUE SPROK RPM MAX # # 4.54 **40.6** VEH # 3.04 ***0.9** 7.5# MPH B-73

| | · , | | | | | | • | | | | / | |
|--------------------------|---------------------------|---|--------------------|----------------------|--------------------|-----------------|-----------------------------------|---------------------|--------------------|------------|------------------|--------|
| GEAR L MAX # Veh # | LDADS AT MAX I INNER # | MAXIMUM TRACTIVE EFFO \$ DUTER \$ INNER \$ SPROK \$ HOTGR=A | μ- # # α | CONDITION DUTER # | RUN INNER # | DATE:NO. | 20-AUG-85;8 INNER # C & D # | OUTER # | INNER # | 00TER # 1 | INNER # 0 F # | OUTER |
| # HDH | RPM # | RPM # | RPM # | RPM | RPH | RPM # | RPM * | RPH # | RPM # | RPM | RPM: | RPH |
| - | TORQUE ftxlbs | TORQUE !! | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE ftxlbs. | TORQUE ftxlbs | TORQUE T | TORQUE T | TORQUE |
| 10.5 | 167.≄ | 167.4 | 3498•≉ | 3498.* | -1073. | -1073.* | -295-# | -295.* | 772.# | 772.4 | 167.* | 167. |
| - | 5314.1 | 5314.1 | 269.1 | 1.692 | 1.968- | -896.1 | -3013.1 | -3013.1 | 288.1 | 288.1 | 608-1 | 608. |
| 12.04 | 191. | 191.4 | 3998-# | 3998. | -1226.# | -1226.# | -337.* | -337.* | 882. | 882. | 191.4 | 191. |
| - | 4675.1 | 4675-1 | 237.1 | 237.1 | -789.1 | -789.1 | -2651.1 | -2651.1 | 253.1 | 253.1 | .535-1 | 535. |
| 13.5# | . 215.* | 215. | 4498° | 4498*# | -1379.* | -1379.≄ | -379.≄ | -379.# | 893.≉ | 993.≄ | 215.# | 215. |
| - | 4179.1 | 4179.1 | 212.1 | 212.1 | -105.1 | -705-1 | -2369.1 | -2369.1 | 226.1 | 226.1 | 478-1 | 478 |
| 15.0≄ | 239.# | 239. | \$ · 1665 | **-166 | -1532. | -1532.# | -421.* | -451.4 | 1103. | 1103.4 | 239. | 239. |
| - | 3781.1 | 3781.1 | 192.1 | 191.1 | -638-1 | -638.1 | -2144. | -2144.1 | 205-1 | 205.1 | 432.1 | 433. |
| 16.5 | 263.≠ | 263.* | \$497. | 5497.# | -1686. | -1686.# | -463.# | -463.# | 1213. | 1213.# | 263.* | 263. |
| - | 3456.1 | 3456.1 | 175.1 | 175-1 | -583-1 | -583-1 | -1960-1 | -1960-1 | 187.1 | 187.1 | 395.1 | 396. |
| , · | 287.4 | 287. | \$997.# | 5997.¢ | -1839. | -1839.# | ±*505- | -505- | 1324.# | 1324.# | 287.≄ | 287. |
| B-74 | 3186.1 | 3186.1 | 161.1 | 161.1 | -537.1 | -537.1 | -1806-1 | -1806.1 | 172.1 | 172.1 | 364-1 | 365. |
| ļ | 310.* | 310. | 4.1649 | #*1649 | -1992. | -1992.# | -548.4 | -548. | 1434. | 1434. | 310.4 | 310. |
| - | 2940.1 | 1-0+67 | 1.69.1 | 149.1 | -496- | 1-96-1 | -1667.1 | -1667.1 | 159.1 | 159.1 | 336.1 | 336. |
| 21.0* | 334.* | 334.# | **9669 | **9669 | -2145.# | -2145. | ±*065- | +-280-≠ | 1544.# | 1544.# | 334-4 | 334. |
| - | 2730.1 | 2730.1 | 138.1 | 138.1 | -461. | -461-1 | -1548.1 | -1548.1 | 148.1 | 148.1 | 312. | :312• |
| 22.5# | 358•# | 358.# | 4.96.₽ | 7496.# | -2299.# | -2299.≄ | -632. | -632•# | 1655. | 1655.# | 358•₩ | 358. |
| - | 2547.1 | 2547.1 | 129.1 | 129.1 | -430.1 | -430. | -1444. | -1446- | 138.1 | 138.1 | 291.1 | 292- |
| 24-0* | 382.* | 382.# | #-966L | **9661 | -2452.# | -2452. | +-419- | +-419- | 1765. | 1765. | 382.* | 382. |
| ••• | 2387.1 | 2387.1 | 121. | 121. | -403-1 | -403-1 | -1354- | -1354- | 129.1 | 129.1 | 273.1 | 273. |
| 25.5 | #*90 | #*90 | 8496* | #*96 * # | -2605.≄ | -2605.# | -716.# | -716.* | 1875. | 1875.# | **90 * | 406- |
| | 2247.1 | 2247-1 | 114.1 | 114.1 | -379.1 | -379.1 | -1274.1 | -1274.1 | 122.1 | 122.1 | 257.1 | 257. |
| 27.0# | 430.≄ | 430°# | 8995.* | \$668 ** | -2758.# | -2758.* | -758.* | -758.# | 1986.# | 1986. | 430 ** | 430. |
| *** | | 2121. | 107-1 | 107.1 | -358-1 | 35.6 | -1203.1 | -1203.1 | 115.1 | 115.1 | 243.4 | 243. |

| GEAR L MAX # VEH # | LOADS AT MAX INNER # SPROK # | CIMUM TRACT. OUTER # SPROK # | IVE EFFORT INNER * | CONDITION OUTER MOTOR=A | ** | RUN NNER # | DATE:NO. OUTER B | 20-AUG-85;8 # INNER # # C & D # | C E D | * * | INNER # | # 0UTER | # # | INNER # | OUTER |
|--------------------------|------------------------------|-------------------------------|-----------------------|-------------------------|----|----------------|------------------------|---------------------------------------|----------|-------|---------|------------------|---------|----------------|--------|
| # HOM | RPM # | RPM # | RPM # | RPM | # | RPM | RPA | # RPH | RPM | # | RPH # | RPM | # | RPH # | RPM |
| | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE | TORQUE | | URQUE | TORQUE | TORQUE ftxlbs | TORQUE - | | TORQUE | TORQUE Ttx1bs | | TORQUE ftlbs | TORQUE |
| 28.5 | 454.# | 454.4 | r, 9495.# | \$*\$656 × | # | -2915. | ~ | +*008- | -800 | # | 2096.# | | \$*960Z | 454* | 454. |
| - | 2009.1 | 2009-1 | 102-1 | 102-1 | _ | -339.1 | -339. | 1-1139.1 | -1139 | - | 109. | | 109.1 | 230.1 | 230- |
| 30.0# | 478. | 478.# | #*5666 | *** 3666 *** | # | -3065. | -3065. | ·# -845.# | -842 | # | 2206.* | * 22(| 206.# | 4.88.# | 478- |
| - | 19081 | 1908-1 | 97-1 | 1.76 | _ | -322.1 | -322• | 1 -1082-1 | -1082 | - | 103- | ā | 103.1 | 218-1 | 218. |
| 31.5# | 501.* | 501. | 10495. | 10495.# | 44 | -3218.#: | -3218. | * -884 * | ₩ - 884- | # | 2316. | * 23 | 316.# | 501.# | 501. |
| - | 1817.1 | 1817.1 | 92.1 | 92. | _ | -307.1 | -307. | 1 -1030.1 | -1030 | - | 98-1 | | 98.1 | 208-1 | 208. |
| 33.0# | 525. | 525° | 10994.* | 10994.# | 46 | -3371.≄ | -3371. | -927. | 126- * | # | 2427.# | 2 | 427°# | 525.# | 525. |
| - | 1734-1 | 1734-1 | 88-1 | 88.1 | - | -293. | -293. | 1 -983-1 | -983 | - | 1.76 | | 1.46 | 198. | 198. |
| 34.54 | 549.4 | \$ 655° | 11494.# | 11494. | 31 | -3525. | -3525. | #*696- # | 696- | # | .2537. | 2 | 537.# | 549.4 | 549 |
| - | 1659.1 | 1659-1 | 84-1 | 84-1 | _ | -280.1 | -280- | -046- | 0+6- | - | 90.1 | | 90-1 | 190-1 | 190. |
| В | 573. | 573.# | 11994.# | 11994.# | # | -3678.≄ | -3678- | .* -1011.* | -1011 | 45 | 2647. | | 2647. | 573.# | 573. |
| - 75 | 1589-1 | 1589-1 | 80.1 | 80.1 | - | -268-1 | -268- | 1-106- 1 | 106- | - | 86. | _ | 86.1 | 182. | 182. |
| *, | \$97. | 597.# | k 12494.# | 12494.# | # | -3831.# | -3831. | * -1053.* | -1053. | * | 2758. | | 2758.≑ | 597.* | 597. |
| - | 1522.1 | 1522-1 | 1.77 | 1.11 | _ | -257.1 | -257. | -1 -863-1 | -863 | | 82.1 | | 82.1 | 174.1 | 174. |
| 39.0≄ | 621.* | 621.* | ; 12993.# | 12993. | # | -3984°# | -3984 | .4 -1095.4 | -1095.# | # | 2868- | 2 | 868.# | 621.* | 621. |
| - | 1461.1 | 1461.1 | 74.1 | 74.1 | _ | -246.1 | -246. | -828-1 | -828 | | 19. | _ | 1.61 | 167.1 | 167. |
| 40.54 | \$45°# | 645. | 13493.# | 13493 | # | -4138. | -4138- | .4 -1137.4 | ¢ -1137 | # | 2978- | * 5 | 978.# | 645. | 645. |
| - | 1403.1 | 1403-1 | 11.11 | 71.1 | _ | -237.1 | -237. | 1-961- 1- | 961- 1 | | 76. | _ | 1.91 | 160.1 | 161. |
| 45-04 | **699 | #*699 | 13993. | # 13993.# | # | -4291. | -4291. | * -1179. | 4 -1179 | # | 3089- | # | \$680 | **699 | -699 |
| - | 1350.1 | 1350-1 | 68.1 | 1 68-1 | - | -228- | -228. | -166.1 | 1 -766 | 1 - 9 | 73. | | 73.1 | 154. | 155. |
| 43.54 | 693. | 693. | 14493.# | 14493.# | # | ****** | -4444. | * -1221.* | + -1221 | # | 3199.# | 31 | 199.* | 693. | 693. |
| - | 1301.1 | 1301-1 | 1.99 | 1.99 | - | -219-1 | -219. | .1 -738.1 | 1 738 | a. t | 70-1 | <u>.</u> | 10-1 | 149.1 | 149. |
| 45.0* | 716.# | 7.6. | # 14992.# | # 14992.# | # | 4-1654- | -4597 | -1264.# | + -1264 | # | 3309. | # | 3309.# | 716-# | 716. |
| - | 1255-1 | 1255-1 | 1-49 | 1 64.1 | - | -212-1 | -212. | .1 -712.1 | 1 -712.1 | 1 - 2 | 68-1 | _ | 68. | 144.1 | 144. |
| | | | | | | | | | | | | | | | |

| *** | | **** | | *** | # # | txibs1 | 3533.1 | * | 1.729 | *** | 880.1 | **0 | 468.1 | # 0 | 200.1 | #*0 | 022.1 |
|---|-------------|---|--|---|-----------------------|--|--------------------------|----------------|-----------------------------|-------------|-----------------------|--------------------|---------------------|--------------------------------|---------------|--------------------------------|---------------------------|
| CONTROLLED NO. CONTR | | 19.5 MAXIMUM VELUCITY, mph = 45.0 ENGINE NET HP. = 440.0 NUMBER OF SPROCKET TEETH = 1.1 ################################### | | stetetetetetetetetetetetetetetetetetete | RPR | ORQUE TORQUE TOR | 1 1 | ** | 3120-124440-110053-1-2627-1 | **0 | 7197.1-1880. | **0 | 5620.1-1468.1 | **0 | 4595.1-1200.1 | 0.0 | 3912.1-1022.1 |
| *** | | *** | | *** | RP # | tx16s1f | 2872.11 | **0 | 11.0749 | **0 | | ** | , | **0 | , | **0 | 9510.1 |
| *** | | **** | | *** | RP# | tx16s1f | 1196.13 | **0 | 1120-12 | .0 | 2234. [17497.] | #*0 | 1744-113662-1 | **0 | 1426. 11171.4 | | • |
| *** | | 0. | | #STEER # | RP M | X I baff | | 4.0 | | | • | **0 | | #*0 | -871.1 | 4.0 | -742. 1214. |
| *** | | 0.094 = | | HINNER #ST | RPH # | RQUETT | 215.1-2 | **0 | 312. -1 | **0 | 8099-1-1365-1 | * | 6324-1-1066-1 | 0.0 | 5170.1 - | ** | 4402.1 |
| **** | | NET HP. | SET-UP | ************************************** | RP# # | txlbs[ft | -26- 15215- 15215- | **0 | -19-111312-111312-1-1907-1 | **0 | 8 1.6608 | **0 | 6324.1 6 | **0 | 5170.1 5 | **0 | 4402.1 4 |
| **** | | ENGINE | HOTOR | ###################################### | RPH # | txlbs/f | -26-11 | **96- | -19.111 | -143.# | -14.1 | -191.4 | -11.1 6 | -239.# | 5 1.6- | ~287.# | -7.1 |
| KCM CRIES (-BCC-85)以外的存储的存储的存储的存储的存储的存储的存储的存储的存储的存储的存储的存储的存储的 | | 45.0 11 ***** | CONFIGURATION II PROPULSION/STEER | ************************************** | RPM # | txibsif | -26.1 | #*96- | -19.1 | -143.4 | -14.1 | -191.4 - | -11 | -239.4 | -9. | # | |
| **** | | mph = 45. TEETH = 11 | CONFIGURATION II Propulsion/steer | ###################################### | # # | tx1bs1f | 5226.1 | 191.4 | 3886.1 | 287.4 | 2782.1 | 382. * . | 2172.1 | 478.4 | 1776.1 | 573.4 | - |
| **** | | CITY. B OCKET T ****** | 2 % | ###################################### | * | txlbslf | | 191.# | 3886.1 | 287.4 | 2782.1 | 382.4 | 2172.1 | 4.8.4 | 1776.1 | 573.# | 1207. 1207. 1512. 1512 |
| *** | | HAXIMUM VELDCITY. UMBER OF SPROCKET | otor * | # INNER # O | RPH # | tx1bs1f | | **0 | 1 | ** | 2220.1 | 0.4 | 1734.1 | *** | 1418.1 | **0 | 1207.1 |
| **** | | HAXINU NUMBER | induction motor | *OUTER *I | RPH # | ORQUEIT tx1bs1f | | **0 | 3102.1 3102.1 | **0 | 2220.1 | ** | 1734.1 | *** | 1418.1 | 0.4 | 1207.1 |
| ***** | | 19.5 | se indu | ************************************** | RPH # | DRQUEIT tx1bs/f | , | 616.# | 1.6- | 923.4 | 1-9- | 1231.4 | _ | 1539.4 | 7 | 1847.# | 7 |
| ***** | | 1018 H | tinghou | 1454444 UTER #1 | R H H | TXIDS C | | 4.919 | -9.1 | 953.0 | -6.1 | 1231.8 | -5.1 | 1539.¢ | 7 | 1947.4 | 7 |
| *** | . l | EIGHT, 1 | for Wes | PROP OC | RPH * | TORQUEIT TEXT PS F | 10001 | 48.4 1007.4 | 748.1 | 72.4 1511.4 | \$35.4 | 96.4 2015.4 1231.4 | 418.1 | 2518.4 | 342.1 | 3022.# | 291.1 |
| 计分类字 医电子性 医克拉特氏 医克拉特氏性 医克拉特氏征 医克拉特氏征 医克拉特氏征 | INPUT DATA: | GRUSS VEHICLE WEIGHT, tons = IRACK PITCH, in = 6.03 | Efficiency data for Mestinghouse by Craig Joseph 10-MAY-85 | GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG | NPH & RPH & RPH & RPH | TORQUE TORQUE TORQUE TORQUE T | 120596. [20596. [1006.] | 4.8 | 115313. 115313. 748. | | 110963-110963-1 535-1 | | 8560.1 8560.1 418.1 | 7.5# 119.# 119.# 2518.# 1539.# | 1.6669 1.6669 | 9.04 143.4 143.4 3022.4 1947.4 | 1 5959.1 5959.1 291.1 |
| **** | IND | ACK PIT | fictent | NNER SC | HOR | TORQUEIT TXIBSIT | 120596-12 | 3.04 48.4 48.4 | 5313. 1 | 72.4 | 0963.11 | \$ 96 | 8560.1 | 119.# | 1-6669 | 143.4 | 1.6565 |
| *** | | 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + | ₩. | ###################################### | MPH & | 1.5 | 12 | 3.04 | = | 4.54 | = | *0.9 | - | 7.5# | - | 9.04 | -(|

and the second of the second

| | MAX BINNER Veh #SPRDK | | #00TER # | # PROP #OUTER #MOTOR # B | #OUTER | A T N A B | # # | æ | #INNER #DUT | # # 04 | D | #00TER # | E | #00TER # | #INNER # | #STEER #MOTOR | x * * | * * | - | * * | * * | _ |
|--|--------------------------|---------|----------|-----------------------------|-----------------|-----------|-------|-----------|-------------|-----------|------------------|------------------|--------|----------|----------|------------------|------------------|-----------------|----------|------------|--------|-------|
| | * | * | * | RPM | | # 89# | | * | * | | | E & | RPH | RPH | RPM | | 1 | # | | | * | |
| 1870 1871 2552 2154 2154 2154 2154 2154 215 21 | 12 | KOUE 11 | rorquel | TORQUE ftxlbs | TORQUE | | E 110 | toue I to | RQUEIT | tx Ibs 1 | rongue ftx1bs | TORQUE ftx1bs | TORQUE | TORQUE | TORQUE | TORGU | ElTORO Littal | UE IT bs f | GROUE | 110R | DE LTC | RQUE: |
| 191-12 191-1 192 | | 167.# | | 3525. | \$ 2154. | - | • | **0 | **0 | \$.699 | 669. | -334. | | | 0 | ٥ | * | ** | 0 | * | # 0 | 0 |
| 1911-8 1911-8 1912-8 2461-8 2 | 1 5 | 1.102 | 5201.1 | 1 | | - | | 53.1 | 053-1 | 1320.1 | 1320. | -1. | -1 | 38 | 38 | -648 | | 1.0 | 8301. | - | _ | 0 |
| 135.6 135.4 133.5 2770.0 2770.0 27.1 1161.1 1161.1 -6.1 -6.1 3380.1 3380.1 -570.1 932.1 7303.1 3004.1 -705 215.4 4533.5 2770.0 2770.0 2770.0 2770.0 2750. | | 191.4 | | | | 4 | | **0 | **0 | 164.\$ | 764.1 | -385- | 1 | 0 | | | | | 0 | * | | 0.4 |
| 135.4 135.4 135.2 1770.4 1770.4 170.4 1030.1 1030.1 -5.1 -5.1 3021.1 3021.1 3021.1 503.1 | • | 576.1 | 4576.1 | | | _ | | 127.1 | 1 | 1161.1 | 1161. | | | 3380 | 3380. | -51 | 6 | 1.2 | 30 | 30 | - | · 60 |
| 1991 1902 1903 2004 2.2 | | \$15. | | | | | * | **0 | **0 | 860.4 | 860. | | -430 | 0 | | | a. | 4.0 | 0 | | 4.0 | 0 |
| 139.4 139.4 130.6 139.6 139.6 139.6 139.6 139.7 139. | • | 1.060 | | , | | _ | - | 1.828 | 828.1 | 1038.1 | 1038. | ' | -5 | 3021 | 1 | 1 | 80 | 3.1 | 6527. | 26 | | -101- |
| 263.4 263.4 5540.4 3386.4 3386.4 0.4 0.4 1051.4 1051.4 -5515.1 2734.1 2734.1 461.1 754.1 5907.1 2330.1 2231.1 -550 263.4 263.4 5540.4 3386.4 3386.4 0.4 0.4 1051.4 1051.4 -552.4 -552.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0 | | 239.4 | | | | * | * | **0 | **0 | 955. | | | -478 | | | • | * | \$ · 0 | • | * | #*0 | 0 |
| 287.4 287.4 5560.4 3386.4 3386.4 368.1 685.1 685.1 685.1 685.1 -4.1 -4.1 2499.1 2499.1 -421.1 689.1 5399.1 2221.1 -580 287.4 287.4 6044.4 3693.4 3693.4 0.4 0.4 1146.4 1146.4 1146.4 1.4 1.4 1.7 1.2 1.9 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 | 1 | | | i | | _ | | 1.051 | 150.1 | 939.1 | 939. | ' | -5 | 27 | 27 | | ~ | - | 5907. | 24 | i | -635- |
| 3363. 3363. 165. -2.1 -2.1 -2.1 665. 665. 665. 665. 665. -4.1 -4.1 -4.1 2499. 2499. -421. 669. 5399. 2221. -560 | | 263.4 | | | | - | ** | ** | | 1051. | | 1 | -525 | | • | 0 | * | # 0 | • | | *** | 0 |
| 287.# 587.# 6044.# 3693.# 3693.# 0.# 0.# 1146.# 1146.# 1146.# -5713.# -5713.# 0.# 0.# 0.# 0.# 0.# 0.# 0.# 0.# 0.# 0 | 1- | 383.1 | | 1 | | _ | - | 1.585 | 685.1 | 858.1 | 858 | +- | | 1 | 1 | -421 | - | 1.61 | 5399. | 1 | ŧ | -580- |
| 310.4 310.6 547.8 4001.8 4001.8 4001.4 4001.4 601.1 791.1 791.1 791.1 -4.1 -4.1 2130.1 2303.1 2303.1 2388.1 635.1 4996.1 2047.1 -555 2878.1 310.4 310.8 6547.8 4001.8 4001.8 4001.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 | | 287.4 | | . 6044. | | * | * * | *.0 | ** | 1146.* | | - 1 | -573. | | | | * | 4.0 | • | 4 | 4.0 | 0 |
| 310.** 310.** 6547.** 4001.** 4001.** 0.** 0.** 1242.** 1242.** -621.** -6.1.** 0.** 0.** 0.** 0.** 0.** 0.** 0.** | - | 118.1 | 3118. | i | _ | _ | 1 | 531.1 | 631.1 | 191.1 | • | _ | | 1 | 1 | | - | 1.5 | 4976. | 1 | | -535. |
| 2876. 2878. 141. -2. -2. 583. 583. 730. 730. -4. -4. 2126. 2126. -358. 586. 4593. 1889. -494. 2671. 2677. 130. -2. -2. 541. 541. 678. 678. 678. -3. -3. 1974. -333. 544. 4264. 1754. -458. 2671. 2677. 2677. 130. -2. -2. 541. 541. 678. 678. 678. -3. -3. 1974. -310. 574. 624. 626. 1754. -458. 2693. 2493. 2493. 122. -1. -1. 505. 505. 633. 633. -3. -3. 1842. 1842. -310. 508. 3979. 1637. -428. 2493. 2493. 2493. 122. -1. -1. 4724. 473. 593. 593. -3. -3. 1726. 1726. -291. 476. 378. 638. 678. | | 310.4 | | 6547 | - | 4 | ** | **0 | ** | 245 | - | -621 | -621 | | | | * | ** | | | * | 0 |
| 334.* 334.* 7051.* 4309.* 4309.* 0.* 0.* 1337.* 1337.* -569.* -669.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0 | - | 878.1 | | 1 | | _ | - | 83 | 583.1 | | 30 | _ | * | • | 2126. | I M | - | - 9 | 4593. | • | • | 464 |
| 2671. 267. 130. -2. -2. 541. 541. 678. 678. 678. -3. 1974. 1974. -333. 544. 4264. 1754. -458. 358. 358. 4555. 4617. 4617. 617. 618. 67 | | 334.# | | 1051. | | 4 43 | **6 | **0 | *** | 1337. | 1337 | 1 | 699- | | | 0 | * | | 0 | 4 | 9.0 | 0 |
| 358.* 358.* 7555.* 4617.* 4617.* 4617.* 0.* 0.* 1433.* 1433.* -716.* -716.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0 | • | 671.1 | 1 | 1 | | _ | _ | 541.1 | 541.1 | 678.1 | 678 | _ | _ | | - | -33 | | - | 4264. | | | 58. |
| 2493. 2493. 122. -1.1 505.1 505.1 633.1 633.1 -3.1 136.2.1 </td <td></td> <td>358.4</td> <td></td> <td></td> <td></td> <td>4 4</td> <td>1.4</td> <td>***</td> <td>0.4</td> <td>433</td> <td>143</td> <td>-716.</td> <td>11- 1</td> <td></td> <td></td> <td></td> <td>*</td> <td>4.0</td> <td>0</td> <td>*</td> <td>***</td> <td>0</td> | | 358.4 | | | | 4 4 | 1.4 | *** | 0.4 | 433 | 143 | -716. | 11- 1 | | | | * | 4.0 | 0 | * | *** | 0 |
| 382.# 382.# 8058.# 4924.# 4924.# 0.# 0.# 1528.# 1528.# -764.# -764.# 0.# 0.# 0.# 0.# 0.# 0.# 0.# 0.# 0.# 0 | 1 2 | 493.1 | • | • | | _ | | 1.505 | 505.1 | 633.1 | 633. | | -3 | 18 | 845 | 1 -310 | | 1.8 | 0 | - | - | 80 |
| 2337.1 2337.1 114.1 -1.1 473.1 473.1 593.1 593.1 -3.1 -3.1 1726.1 1726.1 1726.1 1726.1 -291.1 476.1 31.1 -60.4 67.4 | # | 382.4 | | | | 6 7 4 | *** | **0 | | M. | - | -164- | 4 | | | | * | *.0 | 0 | * | **0 | 0 |
| 406.* 406.* 8562.¢ 5232.* 5232.* 0.¢ 0.¢ 1624.¢ 1624.¢ -812.¢ -812.¢ 0.¢ 0.¢ 0.¢ 0.¢ 0.¢ 0.¢ 0.¢ 0.¢ 0.¢ 0 | - | 337.1 | 2337. | i | | _ | | 473.1 | 473.1 | 593.1 | 593. | | _ | 1 | 1726 | 1 | | 1.9 | 3729. | - | 34.1 | -401- |
| 2199. 2199. 107. -1. -1. 445. 445. 558. 558. -3. -3. 1624. 1624. -274. 448. 3509. 1444. -3 430.* 430.* 9066.* 5540.* 5540.* 0.* 0.* 1719.* 1719.* -860.* -860.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* | | **90* | | | | ¥ 52 | | **0 | **0 | 1624.0 | - | -812. | * -812 | 0 | | | * | * | 0 | * | **0 | 0 |
| 430.* 430.* 9066.* 5540.* 5540.* 0.* 1719.* 1719.* 1719.* -860.* -860.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* | 1 2 | 199.1 | • | 107 | | _ | 1-1 | 1.544 | 1.534 | 558.1 | 558. | _ | -3 | 1 | - | | | 1.84 | 50 | | 44.1 | -377. |
| 101.1 -1.1 -1.1 421.1 421.1 527.1 527.1 -3.1 -3.1 1534.1 1534.1 -259.1 423.1 3314.1 1363.1 -3 | | 430.4 | | * 9066 | | # | ***0 | **0 | **0 | 1719.0 | - | -860 | -860 | | | | * | *.0 | 0 | * | 0 | 0 |
| | 1 2 | 076.1 | 2076- | 9 | | - | i | 421.1 | 421.1 | 527.1 | 527. | | ' | 15 | 153 | | * | 23.1 | 3314 | - | 63.1 | (1) |

| GEAR LDADS DURING MAXIMUM MAX #INNER #OUTER # PROP VEH #SPROK #SPROK #MOTOR | LOAD | X 00X | TER | # PROP #DUTER # | * * | TER # | , Z | * * * | 5 | # INNER | #OUTER | TER #1 | INNER | no.* | #OUTER | #INNER | | * | #INNER | | #STEER | * * | * * | ~ | * * | ¥ | -J | * * |
|---|-----------|-----------------|-------|----------------------------------|-------|----------------|--------|--------|-------|---------|--------|---------|--------|----------|------------------|----------------------|-------|--|--------|---------|--------|-----|-------|----------|--------|--------|---------|-------|
| HOH | MPH # RPH | 8 8 8 | | * | # RPH | H | N O N | # | * | 8 | * | RPM # | N P | * | RPH | * 20* | * | RPH # | M W | 4 | M W | * | RPH | R OR | 4 | M P M | # RPH | * |
| | ftxI | UE I TO | ROUE | TORQUE TORQUE TORQUE TORQUE | EITO | ROUE ×16s | | E TO | ROUE | TOROU | 100 | 100E | 10801 | S I ft | RQUE ×165 | 1080 | UEIT | TORQUE ftxlbs ftxlbs | TORG | UE IT | ×16 | 22 | 100E | TORG | UE IT | ORQUE | TORG | UE |
| 28.54 | 45 | | 454.1 | 28.5¢ 454.¢ 454.¢ 9569.¢ 5848.¢ | | 848. | 5848-# | 4 | 0.4 | | 0.4 18 | 1815.4 | 1815 | * | 401- | | 401.* | .0 | | **0 | ŏ | *** | | | ** | *•0 | | 4.0 |
| _ | 961 | 1 1967.1 1967.1 | 967. | 96 | 1.96 | -1- | -1 | - | 398. | 398.1 | ! | 499.1 | 6 9 | 1.6 | -2.1 | ' | 2.1 1 | 1453.1 | 1453.1 | ŧ | -245.1 | 1 | 401.1 | 31 | 39.1 | 1291.1 | 1 | 37.1 |
| 30°0¢ | 14 4 | | 478.4 | 478.410073.4 | | 6156.4 | 6156. | | **0 | | 0.* 19 | 1910.# | 1910.* | .* | 958. | * -95 | 955. | **0 | | **0 | ė | **0 | 0.4 | | **0 | 0.4 | | ** |
| - | 1868. | - | 868. | | 1 | -1:1 | - | - | 378.1 | 378-1 | 1 | 474.1 | 474-1 | - | -2- | 2 | - | 1380.1 | 13 | 80.1 | -233.1 | 1 | 381.1 | 59 | 81.1 | 1226.1 | 1 ' | 320.1 |
| 31.54 | | 501.4 | 501.4 | 501.#10576.# 6463.# | 9 | 463.4 | 6463. | * | **0 | | 0.# 20 | \$-9002 | 2006 | 2006-4-1 | 003. | 003.4-1003.4 | ** | 0. | | *** | **0 | # | **0 | | | **0 | | **0 |
| - | 111 | 1779.1 1779.1 | 779. | | 87.1 | -1- | 7 | - | 360.1 | 360.1 | 1 | 451.1 | 451.1 | - | -2.1 | | - | 1314.1 | 131 | | -221.1 | 1 | 362.1 | 1 | 2839.1 | 1168.1 | 1 | 305. |
| 33.04 | | \$25.4 | 525.4 | \$25.#11080.# | | 6771. * | 11119 | * | **0 | | 0.# 21 | 2101.# | | 2101.4-1 | 051 | . 4-1051 | ** | 4.0 | | # .0 | **0 | * | ** | | ** | 4.0 | | ** |
| | 169 | 1 1697.1 1697.1 | 697. | 83.1 | - | 7 | 7 | - | 344.1 | 344. | | 431.1 | 431.1 | - | -2.1 | | - | 1254.1 | 1254. | 1 | -211.1 | 1 | 346-1 | • | 2709.1 | 1114.1 | -291. | : |
| 34.54 | | \$*6.5 | 549.1 | 549.411584.4 7079.4 | - 4- | 0.610 | 1019 | | **0 | • | . 21 | 2197.4 | 2191 | .*-1 | .660 | 2197.*-1099.#-1099.# | 4.6 | 0.0 | | *** | *.0 | * | 0.4 | | ** | 4.0 | | 0.4 |
| 1 | 1 162 | 1623.1 1623.1 | 623. | 19.1 | - | -1.1 | | -1:1 | 329.1 | 329 | - | 412.1 | 412.1 | - | -2.1 | | -2.1 | 1199.1 | 1199.1 | 1 | -202- | - | 331.1 | 2591 | - | 1066.1 | -278. | 8 |
| 36.04 | | 573.4 | 573.4 | 573.412087.4 7387.4 | 1 4. | 387.4 | 7387 | | **0 | | 0.4 22 | \$-6622 | 2293 | 1-4-1 | 146. | 2293.4-1146.4-1146.* | # 9 | 0.0 | | *** | .0 | # | | | # 0 | *.0 | | |
| - | 153 | 1 1555-1 1555-1 | 555. | 76.1 | - | -1.1 | | -1.1 | 315.1 | 315.1 | | 395.1 | 395. | - | -2- | 2 | - | 1149.1 | = | 1.64 | -194.1 | 1 | 317.1 | 2482 | - | 1021.1 | 1-267.1 | 3 |
| 37.54 | 597.4 | - 1 | 597.4 | 597.412591.4 7695.4 | * | 695. | 16 | 95.4 | ** | | 0.4 23 | 2388.2 | 2386 | 1-#- | 2388.4-1194.4-11 | -119 | 9.46 | 0.4 | | **0 | • | * | 0.4 | | 4.0 | 0.0 | | 4.0 |
| | 149 | 1 1490.1 1490.1 | 490. | | 73.1 | -1:1 | -1- | _ | 302.1 | 302.1 | • | 378.1 | 378. | - | -2. | _ | 2.1.1 | 11011 | 11011 | ! | -186. | | 304.1 | 237 | | 978. | -256. | 1.9 |
| 39.0# | | 621.* | 621.1 | 621.413095.4 8002.4 | * | 8002. | 8002. | * | **0 | | 0.# 24 | 2484.4 | 2484 | 2484.4-1 | 245.4-1 | -1245 | ** | 0.4 | | **0 | 0.0 | | | | | | | |
| | 143 | 1 1430-1 1430-1 | 430. | 1.07 | | -1.1 | -1- | _ | 290.1 | 290 | - | 363.1 | 363.1 | - | -2.1 | 2- | - | 1056.1 | - | - 1-950 | -178 | - | 291.1 | 228 | 2.1 | 938. | 1 | 245.1 |
| 40.58 | | 645.¢ | 645.8 | 645.413598.# 8310.# | * | 310.0 | 8310 | 4 | **0 | 0 | .4 25 | 2579.4 | | 2579.4-1 | \$-062 | 1-1290 | **0 | .0 | | **0 | 0.4 | | 0.4 | | **0 | 0.4 | | ** |
| _ | 137 | | 374. | 67 | 67.1 | -1.1 | -1- | _ | 278.1 | 278. | | 349.1 | 349.1 | - | -2- | , | 2.1 1 | 015.1 | 1015.1 | • | -171. | | 280. | 219 | 1.2 | 902.1 | -236.1 | |
| 45.0# | | **699 | 669. | 669-*14102-# 8618-# | # | 618.0 | 8198 | | *.0 | 0 | 0.# 26 | 2675.# | 2578 | 2575-4-1 | 337. | .4-1337 | 4.7 | 0.4 | | ** | 4.0 | 4 | ** | | # .0 | 0.4 | _ | # 0 |
| _ | - | 1322.1 1322.1 | 322. | | - | -1.1 | | -1.1 | 268.1 | 268.1 | 1 | 335.1 | 335. | - | -2.1 | | -2.1 | 976.1 | | - 1.916 | -165.1 | 1 | 269.1 | 210 | 1.60 | 868.1 | 1 1 | 227.1 |
| 43.54 | 693. | # | 693.8 | 693.#14606.# | | 8926. | 8926 | * | **0 | 0 | .# 21 | 2770.4 | 2770 | 2770.4-1 | 385.4-1 | 1-1385 | # | 0.4 | | # 0 | 0 | * | 0.4 | Ď | #*0 | **0 | | **0 |
| | - | 3.1 1 | 1273. | | - | -1. | -1 | - | 258.1 | 258. | | 323.1 | 323.1 | - | -2-1 | -2 | 1.2 | 941.1 | 46 | 11.1 | -159.1 | 7 | 59.1 | 2032 | 2.1 | 836.1 | 1 | 218. |
| *0°5* | | 716.* | 716.4 | 716.415109.# 9233.# | # | 9233.# | 9233. | * | .0 | 0 | . 28 | 2866.* | 2866 | 2866.4-1 | 433.4-1 | 1-1433 | ** | 0 | | **0 | **0 | * | | | 4.0 | 0.4 | | 0.4 |
| | 122 | 1228-1 1228-1 | 228. | | - | -1.1 | -11- | _ | 249.1 | 249. | | 312.1 | 312 | - | -2- | | -2.1 | 907.1 | | 907.1 | -153.1 | | 250.1 | 1960. | 1.0 | 806.1 | 1 | 211.1 |

| * | | * | | # 02 | _ | 9 6 | | 165 | 0.0 | 142 | 0 | -4345 | 0.4 | 342 | 0 | 143 | 0.4 | 1 |
|--|-------------|---|--|--|-----------------------|--|----------------|----------------------|--------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------|-----------------------------|------------------------------------|--------|
| VE EFFORT CONDITION BY: RICK LEMIS; REVISION: 8-JUN-85 RUN DATE: 7-AUG-85:7 #################################### | | 19.5 MAXIMUM VELOCITY, mph = 45.0 ENGINE NET HP, = 440.0 NUMBER OF SPROCKET TEETH = 11 settentetectooissetetetetetetetetetetetetetetetetetete | | SERBSTREGEGEGEGEGEGEGEGEGEGEGEGEGEGEGEGEGEGEG | 2 | TORQUE | | -7697 | | -6142 | | 7 | | -3342 | | -2743 | | - |
| * | | i | | 5 # # | # | S S S S S S S S S S S S S S S S S S S | * | 116 | * 0 | 121 | 4.0 | 124 | #.0 | 124 | # 0 | 131 | **0 | 1 |
| * | | * | | ###################################### | 4 | 8 X | | -7697 | | -61421 | | -4342 | | -3342 | | -27431 | | 1 |
| # | | * | | # * | 4 | == | | | | | * | , | 4 | • | 4 | t | 4 | - |
| | | * | | T F R | I | 2 × | -87°# | -116- | -173.4 | -571.1 | -260. | -+0+- | -341.0 | -311. | -434.# | -255. | -520. | - |
| * | | * | | ###### #OUTER # F | # RPH | 124 | - 1 | | - | | | | | | | | | - |
| * | | * | | # W W | | 100 | 24. | -716-1 | -173.8 | -571.1 | -260.# | -404- | -347.4 | 3010-1 3010-1 -311-1 | -434.# | -255.1 | -520. | |
| * | | * | | PERSER PINNER PF | M d | t x | - 1 | | | | | • | | 5 | | • | | - |
| * | | | | * * | * | be d | **99 | 6931. | 132.# | 5531. | 198.4 | 3910.1 | 264.\$ | 0 | 330.# | 2470.1 | 395. | - |
| 8 | | 0. | | ******** ***************************** | A P | TX. | | 693 | = | 553 | 1.5 | 391 | 26 | 301 | m | 24.7 | 3.5 | |
| 5 4 | | * 440.0 | | *** | # | S T | * 00 | = | * | - | * | = | # | = | 330.# | - | * | 1 |
| - R | | H # | | ###################################### | 4 | 2 × | 0 | 6931.1 | 132.* | 5531.1 | 198.4 | 3910.1 | 264.\$ | 100 | 330 | 2470.1 | 395.* | |
| 8-70N-82 | | F . | | *** | # | == . | * | | **0 | • | **0 | 1 | **0 | - | # 0 | | **0 | - |
| 2 4 | | NET HP. | | ### | E P | | 0 | 189 | 0 | 225 | 0 | 573, | 0 | 211 | 0 | 966- | 0 | - |
| *** | | H # | ٩ | ###### #OUTER # D | # | ££ | . | 1-2 | | -2 | | 7 | | 7 | | , | * | 1 |
| RICK LEWIS; REVISION: Run Date: 7-Aug-85;7 ************************************ | | ENGINE ***** | SET-UP | * * | | 9 P P | * | -519.1-2789.1-2789.1 | **0 | -414.[-2225.]-2225.] | ** | -293.1-1573.1-1573.1 | | -225.1-1211.1-1211.1 | * | -966- | * 0 | 111111 |
| . ¥ # | | W # | | ************************************** | MA | 10 t | | -27 | | -22 | | -15 | | -12 | | • | | 1 |
| # 4 # 4 # 4 # 4 # # # # # # # # # # # # | | * | CONFIGURATION I | * * * | # | D P P P P P P P P P P P P P P P P P P P | -239.# | 9.1 | #*6L4- | +: | -718. | 3.1 | -957. | 5.1 | 1.* | -185. } | 6.8 | 1 |
| # # E | | 45.0 11 9000 | ATE H | ######## #OUTER # C | HA | tx1 | -23 | -51 | -41 | 7 | -11 | -29 | -95 | -22 | 119 | -18 | 143 | |
| # C # | | * # # | CONFIGURATION WIN DRIVE MOT | * * * | * | 1 T T T | | | | | | , | | | * | | # | |
| BY: RICK LEWIS; Run Date: 7-A ************************************ | | mph = TEETH | NF I | SE R | MA | 1 P | 4.662- | -519.1 | +-619- | -414.1 | -718.* | -293.1 | +-156- | -225.1 | 161 | -185-1 | 436 | 1 |
| A # | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 141 | *** | * | EE . | | | | | | 1 | | | 910.4-1197.4-1197 | į. | - | - |
| * | | KET | | TER B | | 34 | 182.# | 2511. | 364.# | 2004.1 | 546.# | 1417.1 | 728.4 | 960 | 910 | 895.1 | 160 | - |
| * | | 0C1 | | essessessessessessessessessessessessess | * | 12 | - 1 | | 1 | | | = | | Ξ | | | - | i |
| | | VEL SE | • | * * | | 165 | 182.8 | 2511.1 | 364.4 | 2004.1 | \$*995 | 17. | 728.4 | 90 | 910.# | 895.1 | 91. | - |
| | | ¥ 0 # | | #INNER | 4 | £ 2 | - ! | 25 | 1 | 20 | | = | | 10 | | 80 | 10 | - |
| EFFORT CONDITION ************** | | MAXIMUM VELOCITY. Number of Sprocket | | * * * | * | D S I | -571# | 280.1 | -1143# | 1.622 | -1715# | 158.1 1417.1 | -2286 | 121.1 1090.1 1090.1 | -2858# | 1001 | -3430# 1091.# 1091.#-1436.#-1436.# | 1 |
| 0 # | | E 3 # | Botor | * A | T d | 4 × 4 | 1 3 | 28 | = | 22 | -1. | 15 | -22 | 12 | -28 | 10 | -34 | |
| # # # # # # # # # # # # # # # # # # # | | * | | *** | # | # # E | # | - | # | - | | - | | - | # | - | #0 | 1 |
| 4 4 | | 19.5 | mopolar -85 | # # A A | # d | X X | -571# | 280- | -1143# | 223.1 | -1715# | 158.1 | -2286# | 121.1 | -2858# | 1001 | -3430# | - |
| w & | | | -85 | *** | * | | | _ | | _ | # | - | | - | # | - | * | - |
| 113 | | 9 8 | HAY | 0 R 8 | x | 100 | 500.0 500. | -320-1 -320- | 1001.* 1001. | 55 | 01. | 80 | 101 | 39 | 2501.# 2501. | 4 | 200 | 1 |
| * * | | 400 | 20- | # 0 F | 8 | 22 | | 7 | - | 7 | = = | Ī | ¥ 20 | I | 2 | 7 | 3 | - |
| 5 # | | 5.0 | 4 6 | *** | - | W 8 | | .03 | - | 55. | | 90 | 1.1 | 99. | 11. | 4 | 02. | - |
| × * | | 5" * | 6 6 | NN | 2 | 2 X | 2 | - | 10 | -2 | 150 | 7 | 20 | 7 | 25 | 7 | 30 | - |
| ¥ # | 1 | 7 4 4 | Sign | ## 2 | | | | | | = | * | = | 4 | - | * | = | * | 1 |
| A THE | INPUT DATA: | H. | Efficiency data for Ho by Gene Siedler 20-MAY | UTE | H | TORQUE TORQUE TORQUE TOR | \$2 | 119131-1191301 | 48. 4.8.4 | 115265. 15264 -255. -255. | 12. | 110793.[10792] -180.[-180. | 96 | 1 8306.1 83061 -139.1 -139. | 119 | 1 5817-1 6817] -114.1 -114. | 143 | 1 |
| 20 4 | DAN | VEH | E F | # 2 | * | E . | * | - | | = | * | = | 4 | - | * | - | * | 1 |
| ADS | Ä i | 8 × * | | RER | I | N X | 74 | EE | 4.8 | 265 | 72. | 793 | 96 | 306 | 119 | 817 | 143 | 1 |
| GEAR LDADS DURING MAXIMUM TRACTI ************************************ | | GROSS VEHICLE MEIGHT, tons = TRACK PITCH, in. = 6.03 | | sessesessesessessessessessessesses MAX sinner souters inner souter Vem ssprok ssprok* Hotor smotor | MPH & RPH & RPH & RPH | 124 | 1.54 24.# 24.# | 119 | 3.04 | 115 | 4.5¢ 72.¢ 72.¢ 1501.¢ 1501. | 110793.1107921 | 6.0¢ 96.¢ 96.¢ 2001.¢ 2001. | 1 8306.1 83061 -139.1 -139. | 7.5# 119.# 119.# | 1 5817-1 6817] -114-1 -114. | 9.0# 143.# 143.# 3002.# 3002. | 1 |
| GEAR LDADS DURING MAXIMUM TRACTI ************************************ | | * | | VEX P | I | == | 1:5 | | 3.0 | 1 | 4.5 | | 6.0 | | 7.5 | | 9.0 | |

| VEAX | MAX *INNER | #OUTER# INNER #OUTER #SPROK# MOTOR #MOTOR | MOTOR # | | # INNER | #0UTER #INA | | * 8 * | 0 | # C # | # 10 # | OUTER D | I WER | #00TER #I | 2 T | #0UTER #TI | NNER | #0UTER # |
|-------|------------|--|---------|---------------|----------|--------------------------------------|----------|-------------------|----------|----------------|----------|------------|---------------|-----------|----------------|------------|---------------|----------|
| HAH | | RPH + RPH 4 RPH | | * * | # RPH | # RPH | # RPM | # RPM # | E P | # RPM | A RPH # | H GR | M dd | R P R | # | RPH # | RPH # | E G W |
| | | ITORQUEITORQUITORQUE ITORQUEIT Iftxlbs/ftlbs/ftxlbs ftxlbs/f | TORQUE | TORQUEIT | 0+ | RQUE TORQUE x bs ftx bs | TORQUE | Torque ftx1bs | TORQUE | TORQUE | TORQUE | TORQUE | TORQUE | TORQUE | TORQUE | TORQUEIT | OUE TORQUE IT | ORQUE |
| 10.54 | | 167.# 167.# | | 3502.4 3502.4 | +-4002# | -4002 | # 1273.# | 1273.4- | 1676 | .4-1676.4 | **0 | 0 | 4 91.* | 461.# | -607. | 607.* | 0.* | . 0 |
| | 1 5036.1 | 1 50351 | -84. | -84. | 74. | 74. | 661. | 661.1 | -137. | 1 -137. | 1-134-1 | -734-1 | 1824. | 1824.1 | -188.1 | -188.1 | -20261 | -2026 |
| 12.04 | | 191.4 191.4 | 4005-4 | 4005.8 | 1 -4573¢ | -4573# | 1455. | 1455.4- | 1915. | \$-1915° | **0 * | **0 | \$27. | \$27.# | -694.# | 0 | 4.0 | 4.0 |
| | 1 4464 | 1444. 4444 | -74. | -74.1 | 65.1 | 65.1 | 583.1 | 583.1 | -121-1 | -121- | 1 -648.1 | -648.1 | 1610.1 | 1610.1 | -166.1 | -166.1 | -17881 | -17881 |
| 13.54 | 54 215.4 | .8 215.0 | 4.502.# | 4505. | -5145# | -5145# | 1637.# | 1637.4- | -2154.# | 4-2154.4 | **0 | **0 | 593.4 | 593. | -781. | -781.4 | **0 | **0 |
| | 1 3984.1 | 1 39841 | -67.1 | -67. | 58.1 | 58. | 523. | 523. | -108. | -108- | 1-581.1 | -581. | 1444.1 | 1444-1 | -149.1 | -149.1 | -16031 | -16031 |
| 15.00 | \$ 239.0 | | \$003.4 | 5003.# | 1 -5717# | -5717# | 1819.# | 1619. | *-2394. | #-2394. | # 0 # | | 4.659 | 659. | -867.4 | -867.4 | 4.0 | 0.0 |
| | 1 3597.1 | 1 35971 | -60-1 | -60-1 | 53. | 53.1 | 472.1 | 472.1 | -98- | -98- | 1 -524-1 | -526-1 | 1303.1 | 1303.1 | -135.1 | -135.1 | -14471 | -14471 |
| 16.54 | 5# 263.# | .# 263.4 | 5503.4 | 5503. | -6288# | -6288# | 2001. | 2001.#- | 2633. | #-2633. | # 0 # | 0.* | 725.4 | 125. | #*956- | -954.\$ | **0 | #*0 |
| | 1 3281.1 | .1 32801 | -55.1 | -55. | 1.84 | 48.1 | 431.1 | 431.1 | -88- | -88- | 1-478-1 | -478.1 | 1189.1 | 1189.1 | -123.1 | -123.1 | -13201 | -13201 |
| 18.0# | 1 287.# | . 287.4 | \$003. | \$6009. | -6860# | +0989- | 2183.# | 2183. | #-2872. | #-2872. | #*0 # | **0 | 191.* | 791.8 | -1041-#- | -1041.4 | | **0 |
| | 1 3017 | 3017.1 30171 | - 50.1 | -50.1 | * | ; | 396. | 396. | -82 | 1 -82.1 | -640- | -440.1 | 1093.1 | 1093.1 | -113.1 | -113.1 | -1214 | -1214 |
| 19.54 | # 310.# | . 310.¢ | 6503.# | 6503.4 | -1432# | -7432# | 2365.# | 2365 | *-3112. | *-3112. | * 0 * | 0.* | 857.# | 857 | . #-1127. #-11 | 1127.# | **0 | 0.4 |
| | _ | 2784.1 27831 | 1-11-1 | -47.1 | 41.1 | 41.1 | 365.1 | 365.1 | -75.1 | 1-25-1 | -406.1 | -406-1 | 10001 | 10001 | -104.1 | -104-1 | -11201 | -1120 |
| 21.04 | # 334·# | # 334.# | 7004. | 7004. | -8004 | +9008- | 2547.4 | 2547.4 | -3351. | *-3351. | **0 | **0 | 923.# | 923.#- | 1214 | .4-1214.4 | 4.0 | 0.4 |
| | | 2583.1 25821 | -43.1 | -43. | 38. | 38. | 339.1 | 339.1 | -70- | -10.1 | -377.1 | -377. | 936.1 | 936.1 | -97.1 | -97.1 | -10391 | -10391 |
| 22.54 | 4 358.4 | 4 358.4· | 4.4057 | 7504. | -8575# | -8575# | 2729.* | 2729.4- | 3590. | #-3590°# | **0 | | 989.# | 989.4- | -1301-4- | 1301.4 | **0 | 4.0 |
| | - | 2408-1 2408 | 1-04- | -40.1 | 35.1 | 35.1 | 316. | 316. | -65. | 1-65-1 | -351.1 | -351.1 | 873.1 | 873.1 | 1-06- | -90-1 | 1696- | 1696- |
| 24.0# | 382.4 | . \$ 382. ¢ | 8004. | 8004. | -9147# | -9147# | 2911.4 | 2911.4- | -3830. | -3830.4 | #*0 | | 1055. | 1055. | -1388.4- | 1388.4 | ** | 0.4 |
| | 1 2255.1 | 1 22541 | -38- | -38. | 33. | 33.1 | 296. | 296.1 | -61. | -61.1 | -329.1 | -329.1 | 817.1 | 817.1 | -84.1 | -84.1 | 1706- | 1206- |
| 25.54 | # *90 * # | 4 406.9 | 8504.# | 8504.# | -9719# | -9119# | 3093. | 3093. | *-6909- | 4-6909-# | **0 | 0.* | 1120.# | 1120.4 | -1474.8- | -1474.# | 4.0 | **0 |
| | 1 2119. | 2119.1 21191 | -35.1 | -35. | 31. | 31.1 | 278.1 | 278.1 | -57.1 | -57.1 | -309-1 | -309.1 | 768.1 | 768.1 | 1.61- | -19.1 | -8521 | -8521 |
| 27.04 | \$ 430°# | | 9005. | 006 | 10291 | -102914 | 3274.4 | • | -4308. B | *-4308** | **0 | 0.* | 1186.4 | 1186.#- | -1561.4- | 1561.0 | 0.4 | 0.0 |
| | | | -33.1 | -33.1 | 29.1 | 29.1 | 262.1 | 269.1 | - 54 | -54 | -291 | . 100 | 136 1 | 134 | | | | 12 00 - |

RUN DATE: 20-AUG-85:109

INPUT DATA:

ENGINE NET. HP. 45.0 NAXIMUM VELDCITY; mph. = 45. 40.0 VEHICLE WEIGHT, tons = TRACK PITCH, in. = 7.63

= 880.0

THIN DRIVE HOTOR SET-UP CONFIGURATION I Ħ Efficiency data for Westinghouse induction motor by Craig Joseph 10-MAY-85

38. 57. 76. 113. 94. 2070-6114. 1762. 4529 3242. 2532 ftlbs TORQUE # DUTER RPM * 38. # 51°# 19.4 4-76 16.4 113.* 1761. 6109.1 4525. 3239-1 2529.1 2068-1 ftlbs TORQUE # INNER RPI u. 87.4 #36.# 174.4 262.# 349.4 2142.1 523. 2891.1 1533. 1197.1 979. TORQUE ftxlbs DUTER RPH ш # 87.4 134.4 262.4 2891.1 2142-1 1533. 340.4 1197.1 436.4 979.1 523. 833.1 TORQUE INNER RPR ш # * -33.* -167.# +-19--100.4 -133.4 -200°+ -30292. -22436.1 -10255.1 -16062. -12542.1 TORQUE ftxlbs DUTER C & D RPE -33.# -167.# -30292---67. -100.4 -200°+ -22436.1 -133.4 -12542. -10255.1 -8730.1 -16062. ftxlbs TORQUE INNER C & D RPH -121. -364°# -- 909--9013. -242. -6576.1 -485.4 -727. -2598. -4779-1 -3732 -3051-1 TORQUE ftxlbs OUTER RPM œ -121.# -245-# -364。中 -485.4 **#*909-**-727. # -9013.I -4779. -2598. -6676. -3051. ftxlbs TORQUE INNER RPM ω # # 395.# 780.1 790.4 2003.1 1186.4 1581.4 1976.# 916. 2371.* 1120.1 2705.1 1434. # MOTOR=A TORQUE ftxlbs * OUTER RPM 45 395. \$ 790.# 1136.4 1581.4 1976.* 916. 2371.4 780-1 2706.1 2004-1 1435. 1120.1 MOTOR=A TORQUE ftxlbs # INNER RPH 41 # 19.4 38°# 57.4 16.4 4.46 113.4 53424 39569-28328-22120-1 18085. 15397.1 ftxlbs TORQUE OUTER SPROK RPH # 11 # 19.4 57.4 **4.46** 76.4 53424. 38. ₩ 113. 39569. 28328.1 15397.1 22120 18085. ftxlbs TORQUE INNER SPROK RPH B-82 HAX W # 44 \$0°6 7.54 49.4 **#0.9** YEK VEH HPH

| GEAR L | LOADS AT HAX I INNER # | MAXIMUM TRACTIVE # DUTER # IN # SPROK # MOT | EFFORT INER | CONDITION \$ OUTER # * MOTOR=A # | RUN INNER # | DATE:No. | 20-AUG-85:109 INNER # C & D * | 9 0UTER # C & D # | INNER # | OUTER # | INNER # | OUTER F |
|--------|---------------------------|---|--------------------|--|--------------------|--------------------|-------------------------------------|-------------------------|--------------------|--------------------|-------------------|-----------------|
| WHA | RPM | RPM | ** | RPH # | RPH # | RPM # | RP# # | RPH # | RPM # | RPM # | M M M | RPM |
| | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE 1 ftx1bs | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE' ftxlbs | TORQUE ftxlbs | TORQUE ftxlbs | TORQUE ftlbs | TORQUE ftlbs |
| 10.5* | 132.4 | 132.4 | 2766. | 2766.# | -848- | -848- | -233. | -233°# | 611.≉ | 611.4 | 132.# | 132. |
| - | 13439-1 | 13439.1 | 681.1 | 680.1 | -2267.1 | -2267.1 | -7620-1 | -1620-1 | 127.1 | 727.1 | 1537.1 | 1538. |
| 12.04 | 151. | 151. | 3162.* | 3162.4 | -910- | **016- | -266. | -266.# | *** | **869 | 151.# | 151. |
| - | 11824-1 | 11824-1 | 599-1 | 1.665 | -1995. | -1995.1 | 1-4019- | -6704.1 | 640.1 | 1.049 | 1352.1 | 1353. |
| 13.5 | 170.4 | 170.# | 3557.# | 3557.# | -1091. | -1091- | -300. | =300- | 785.# | 785.# | 170.# | 170. |
| - | 10568-1 | 10568.1 | 535-1 | 535.1 | -1783.1 | -1783.1 | -5992.1 | -5992-1 | 572.1 | 572.1 | 1208-1 | 1209. |
| 15.0# | 189.≑ | 189.4 | 3952.# | 3952.# | -1212.# | -1212.4 | -333•# | -333。≉ | 872.# | 872.# | 189.* | 189. |
| - | 9563.1 | 9563-1 | 484. | 484.1 | -1613.1 | -1513-1 | -5422.1 | -5422-1 | 518-1 | 518.1 | 1094.1 | 1094. |
| 16.5 | 208.* | 208** | 4347. | 4341°# | -1333. | -1333. | -366. | -366.# | **096 | \$*096 | 208.* | 208- |
| - | 8741.1 | 8741.1 | 443.1 | 443.1 | -1475.1 | -1475.1 | -4956.1 | -4956.1 | 473.1 | 473.1 | 10001 | 1000 |
| I | 227.4 | 227. | 4743.# | 4143.# | -1454.# | -1454. | -400*- | ÷*005- | 1047.4 | 1047. | 227.* | 227. |
| 3-83 | 8056.1 | 8056-1 | 408-1 | 4.08.1 | -1359.1 | -1359.1 | -4568.1 | -4568.1 | 436.1 | 436. | 921.1 | 922. |
| 3 | 246.# | 246.# | 5138. | 5138.# | -1575.# | -1575.# | -433.≄ | -433.# | 1134.* | 1134.* | 246-# | 246. |
| ! - | 7436.1 | 7436-1 | 377.1 | 376.1 | -1254-1 | -1254.1 | -4216.1 | -4216.1 | 402-1 | 402-1 | 850.1 | 851. |
| 21.0# | 264.# | 264.# | 5533.* | 5533.# | -1691-# | -1691- | -466. | ±*99*- | 1221.* | 1221.* | 264.# | 264. |
| - | 6903.1 | 6903.1 | 350-1 | 349.1 | -1165. | -1165:1 | -3914- | -3914.1 | 374.1 | 374.1 | 789.1 | 790. |
| 22.5 | 283.4 | 283.# | 5928.# | 5928.# | -1818.* | -1818.* | -200-# | ±-005- | 1308.# | 1308. | 283.# | 283. |
| - | 6442-1 | 6442.1 | 326.1 | 326.1 | -1087.1 | -1087.1 | -3652.1 | -3652.1 | 349.1 | 349. | 737.1 | 737. |
| 24.0# | 302.4 | 302.# | 6323.* | 6323.# | -1939.# | -1939.* | -533.≄ | -533.# | 1396.# | 1396.# | 302.* | 302. |
| - | 6038.1 | 6038-1 | 306. | 306.1 | -1019.1 | -1019.1 | -3424- | -3424.1 | 327.1 | 327.1 | 690-1 | 691. |
| 2.5.5 | 321.4 | 321.* | 6719. | 6719. | -2060. | -2060. | -566+ | -566. | 1483.# | 1483.* | 321. | 321. |
| - | 5682.1 | 5682.1 | 288.1 | 288-1 | -656- | -656- | -3222-1 | -3222. | 308.1 | 308.1 | 650.1 | 650. |
| 27.0* | 340** | 340.# | 7114.* | 7114.* | -2181. | -2181.# | #*009- | +-005- | 1570.# | 1570.* | 340.* | 340- |
| - | 5365.1 | 5365. | 272.1 | 272.1 | -905.1 | -905-1 | -3042-1 | -3045- | 290-1 | 290-1 | 613.1 | 614. |

| GEAR L | LOADS AT * INNER * SPROK | HAX ** | HAXIMUM TRACTIVE | > ## | EFFORT NNER TOR=A | * # | CONDITION OUTER * | INNER | 8 4 4 S | DATE:No. | 20-AUG-85:109 INNER * C & D * | * * * | OUTER C & D | * * | INNER | ** | OUTER | # INNER | ## | OUTER | œ |
|--------|--------------------------|-----------|------------------|------|-------------------------|-----|--------------------|---------|---------|--------------------|-------------------------------------|-------|----------------|-----|--------|---------|--------|-----------------|--------|--------|------|
| # Hd# | RPM | # | RPM | # | RPH | ** | RPM # | RPM | 41- | RPH | RPH | # | RPM | # | RPM | # | M d M | # RPM | # | R O M | _ |
| | TORQUE ftx16s | | TORQUE ftx1bs | | TORQUE | | TORQUE ftxlbs | TORQUE | | TORQUE ftx1bs | TORQUE | | TORQUE | | TORQUE | | TORQUE | TORQUE ftlbs | UE I | TORQUE | 1 20 |
| 28.5≉ | 359 | # | 359. | # | 7509.4 | # | 7509. | -2303- | 3.4 | -2303.# | -633 | # | -633. | * | 1657. | * | 1657. | m # | \$*651 | | 359. |
| - | 5082 | -: | 5082 | - | 257.1 | _ | 257.1 | 8- | 857.1 | -857.1 | -2881 | - | -2881. | - | 275- | - | 275- | - | 581.1 | 3 | 585 |
| 30.0#· | 378 | # | 378. | # | 7904.¢ | # | 1904.# | -245 | 2424.# | -2424-# | -999- | # | -999- | # | 1745.# | 44 | 1745. | # | 378.# | m | 378 |
| - | 4826 | = | 4826.1 | _ | 244.1 | _ | 244.1 | -81 | -814.1 | -814-1 | -2737. | - | -2737.1 | - | 261. | _ | 261. | - 5 | 552.1 | 5 | 552 |
| 31.5# | 397 | 45 | 397.4 | 41 | 8299. | 45 | 8299.# | -254 | 545.# | -2545.# | -669- | # | #*669- | # | 1832. | # | 1832.4 | m # | 397.# | ĺω | 397 |
| - | 4596 | - | 4596-1 | _ | 233-1 | _ | 233.1 | -775. | 5.1 | -775-1 | -2606 | - | -2606- | _ | 249.1 | - | 249- | | 526.1 | 3 | 526 |
| 33.0* | 415 | 45 | 415.# | # | 8695.* | 상 | 8695.# | 266 | 2666.# | -2666.# | -733. | 45 | -733.# | . # | 1919.# | * | 1919. | | 415.# | 4 | 415 |
| - | 4386 | - | 4386.1 | _ | 222.1 | - | 222. | -74 | -740-1 | -740.1 | -2487. | - | -2487. | - | 237.1 | - | 237. | | 502.1 | 25 | 505 |
| 34.5 | 434°# | 41 | 434•# | 44 | **0606 | 44 | **0606 | -2787 | 7.4 | -2787. | -166. | 46 | -166.* | # | 2006-# | # | 2006.# | * | 34.# | 4 | 434 |
| • | 4194 | - | 4194.1 | - | 212.1 | _ | 212. | -708 | 8-1 | -708.1 | -2378. | _ | -2378.1 | _ | .227. | _ | 227.1 | | 480.1 | 4 | 480 |
| B-8 | 453 | # | 453.# | # | 9485. | 26 | 9485.# | -2909*: | # 6 | -2906°- | -199. | # | F-661- | * | 2094.* | æ | 2094.# | | 453°# | 4 | 453 |
| 34 | 4019 | - | 4019.1 | - | 204-1 | _ | 203.1 | -67 | 678.1 | -678.1 | -2279-1 | _ | -2279- | _ | 218-1 | | 218.1 | 4 | 60.1 | 4 | 460 |
| *(*) | 472. | 48 | 472.# | 45 | \$880. | عد | \$880. | -303 | 3030.≄ | -3030* | -833•# | # | -833.# | * | 2181-* | se | 2181. | | 412.# | 4 | 472 |
| - | 3850 | - | 3850-1 | _ | 195.1 | _ | 195.1 | -65 | 650.1 | -650.1 | -2183. | _ | -2183.1 | | 208.1 | _ | 208.1 | 4 | 40.1 | 4 | 441 |
| 39.0* | 491. | # | 491°# | , | 10275.# | | 10275.# | -3151. | 1.0 | -3151. | -866. | # | -866. | и | 2268.* | 24 | 2268. | | 491.4 | ¥r | 91 |
| _ | 3594 | - | 3694-1 | _ | 187.1 | | 187.1 | -62 | 623.1 | -623.1 | -2094 | _ | -2094. | | 200-1 | | 200-1 | | 422.1 | * | 423 |
| 40.5≄ | 510. | # | 510.# | | 10671.# | | 10671.# | -327 | 3272.* | -3272.# | -868- | # | **668- | 34 | 2355-# | 30 | 2355.* | | 510.# | , | 510 |
| _ | 3549 | - | 3549. | | 180.1 | | 180.1 | -599 | 1.6 | -288.1 | -2013- | _ | -2013. | | 192-1 | | 192.1 | | 406.1 | 4 | 406 |
| 42.0* | 529. | 45 | 529.* | | 11066.# | | 11066. | -3393. | #•€ | -3393. | ±-633. | 45 | -933.* | | 2442. | | 2442. | NA. | \$.62 | 25 | 529. |
| _ | 3415 | - | 3415. | _ | 173.1 | | 173.1 | -576- | 1 - 9 | -576.1 | -1936. | _ | -1936. | - | 185.1 | | 185.1 | 36 | 391.1 | 36 | 391. |
| 43.5* | 548. | # | 548.# | , | 11461.* | | 11461.* | -3515. | \$•\$ | -3515.# | ***996 - | * | *-996- | | 2530.4 | | 2536. | | 548. | 50 | 548 |
| - | 3290. | _ | 3290.1 | | 167.1 | | 167.1 | -555- | 5-1 | -555. | -1866. | _ | -1866.1 | | 178-1 | j - | 178.1 | | 376.1 | 37 | 377. |
| 45.0≄ | 567. | # | 567. | | 11856.≑ | | 11856.# | -3636. | # | -3636.≄ | **666- | 15 | **666- | | 2617.# | ., | 2617. | | \$67. | 56 | 567. |
| - | 3174.1 | - | 3174.1 | | 161. | | 161.1 | -535- | 2.1 | -535.1 | -1800. | _ | -1800.1 | | 172.1 | | 172.1 | 36 | 3.1 | 36 | 363 |

| ************************************* | * 40.0 MAXIMUM VELOCITY, mph = 45.0 ENGINE NET HP. * 880.0 Number of Sprocket Teeth = 11 ********************************** | | statetstatetstestatetatetstatetstatetstatetstatetstatetstatetstatetstatetstatetstatetstatetssatetstatetstatets MAX ¢INNER couter & PROP souter alnner aduler sinner aduler tinner couter tinner souter tinner steer a H a J a K a L ; Vem asprok asprok amotor a 8 a b c a c a d a b a c a c a c a c a c a c a c a c a c | × | TORQUE | 0 | -67.139467.139467.1-6652.110885.185266.135074.1-9163. | 9 | 7891. [61809. [25425. [-6643. | • | 5649.[44250.]18202.[-4755. | 0 | 4411. 34553. 14213. -3713. | 5 | 3606.128251.111621.1-3036. | 0 |
|---------------------------------------|---|--|--|-------------------|---|--------------------------|---|---------------------|-------------------------------|------------------|----------------------------|-----------------------------|----------------------------------|------------------------------|-----------------------------|---------------------------------------|
| * | * | | * * * | 4 | 157 | # | - | 4 | - | 4 | 1 | | 1 | | = | 4 |
| | | | * * | E G | ROUE ×153 | | 074. | | 425. | 0.4 | 202 | 0 | 213. | 0 | 621. | 0.4 |
| | * | | * | DC # | 22 | * | 135 | * | 125 | # | 118 | | 114 | # | Ξ | 4 |
| | * | | * | | 1000 | 4.0 | 99 | **0 | .60 | 0.4 | 50. | 0.4 | 53. | #•0 | 51. | • |
| | * | | *7 | # RPH | 1 ± ± | | 852 | | 618 | | 44 | | 34.5 | | 1282 | * |
| | | | * | | 10 E | ** | 92 | | 91. | 0.4 | .64 | | : | **0 | .90 | **0 |
| | * | | * = | RPH | ## ## ## ## ## ## ## ## ## ## ## ## ## | | 108 | | | | | | | | ŧ | _ |
| | * | | *** | # | D S I | # 0 | 25.1 | **0 | 1.2. | # · 0 | 2.1 | *.0 | | # 0 | - | **0 |
| | 0 * | | *STEER *MOTOR | A P | TOR | | 99 | | -48 | | 34 | | -26 | | -22(| |
| | 880.0 | | * * * | # | D S | # 0 | | * 0 | 9.1 | | 2.1 | **0 | 3.1 | **0 | 9 | *** |
| | | | ATANER FINNER | RPH | URO TXI | | 1946 | | 860 | | 0.48 | | 599 | | 307 | |
| | ± * | ş | *** | # | 1 T | | = | | - | ** | 21-3 | ** | = | ** | | 4 |
| | NE'I | SET- | # F | a a | URGE | - | 1946 | 3 | 8605 | 3 | 048 | 3 | 5883 | 3 | 3076 | |
| | ENGINE NET HP. ************************************ | 20 | *** | * | E T | * | .13 | * | -48.128609.128609.1-4822.1 | # | -35-120482-120482-1-3452-1 | * | -27.[15993.[15993.[-2696.] | # | -22.113076.113076.1-2204.1 | 4 |
| | EX C | MOTOR SET-UP | #### #INNER # E | A P | 800 x16 | -38.* | -67 | -16. | 4.8 | -113.4 | -35 | -151-# | -27 | -189.# | -22 | -227-# |
| | * | | *** | # | 12.5 | # | - | * | - | | - | | - | | - | |
| | 9 # | STE | # # E # | RPR | X 200 | -38.# | -67.1 | -76. | -48. | -113.# | -35.1 | -151- | -27.1 | -189.# | -22- | -227.4 |
| | 45.0 = 11 ** | TON | ###### #DUTER # E | * | EE | | | | • | | | | | | | |
| | # # # | CONFIGURATION II Propulsion/steer | # H | | 100 | 16.4 | 56. | 151. | 9827.1 | \$27.5 | 7035. | 302.4 | 5493. | 378.\$ | 4492.1 | 453.4 |
| | mph = TEETH | S ON | ###################################### | # RP # | 15 | | 113 | | 9 | | , | | 1 | | , | |
| | × + + + + + + + + + + + + + + + + + + + | - | # 22 | | 00E | 16.4 | 56. | 151.# | 9827.1 | 227.* | 1035.1 | 302.# | 5493.1 | 378.4 | 4492.1 | 453.4 |
| | VELOCITY. F SPROCKET | | ****** ******************************* | # 20 # | 10k | | 135 | | , | | l . | | • | | | |
| | VEL | # # L | * * * | | 1 PS | 4.0 | 23.1 | 4.0 | 7844.1 | * 0 | 5616.1 | **0 | 4385. | ** | 3585.1 | • |
| | N 0 4 | 10 | # C C | E G | ftx f | | 108 | | 78 | | 56 | | 43 | | , | |
| | NAXIMUM NUMBER OF | 5 | * * * | # | DE | **0 | 1.1 | **0 | 7844.1 | **0 | 5616.1 | **0 | 4385-1 | **0 | 3585.1 | 4 |
| | x 2 8 | ıcti | ###### #BUTER | S. | 35 | | 1082 | | 78. | | 561 | | 436 | | 358 | |
| | , * | induction motor | * * * | * | UE 1 | 243.8 | -32. 10821. 10821. 13556. 13556. | 4.184 | 1-53-1 | 730.4 | -16.1 | 974.* | -13.1 | ** | -10.1 | 4 |
| | 0.04 | | #INNER | A P | 1x1 | 24 | -3 | * | -2 | 13 | - | 9.1 | - | 1217. | 7 | 146 |
| | * # | NY-85 | *** | * | JEIT 5514 | ** | - 2 | 4. | 3.1 | *** | 1.5 | 4. | 3.1 | *- | | * |
| | # # E # | ting- | UTE | RPM | URO EX LE | 24: | -32.1 | 4.8 | -23.1 | 730. | -16. | 97. | 7 | 121 | 7 | 146 |
| | GROSS VEHICLE WEIGHT, tons Track Pitch, in. = 7.63 | Efficiency data for Westinghouse by Craig Joseph 10-MAY-85 | *** | # RPM # RPM # RPM | E IT | * | - | 38.4 38.4 797.4 487 | - | 57.4 57.4 1195.4 | - | | 121649. 21649. 1057. -13. | * | 117701.117701.1 865.1 -10.1 | # |
| | THU THE | 102 | 780P | He | 1x1b | 398 | 1610 | 161 | 1892 | 1195 | 1354 | 1593 | 1057 | 1991 | 865 | 9.04 113.4 113.4 2390.# 1460.# 1460.# |
| = | 1 3 4 | \$ 0 | * * * | * | E | * | - | | - | * | - | * | - | * | - | 21 |
| DA | 17. # | 9 6 | TER ROK | E d | x 1b | 19 | 424 | 38 | 727 | 57 | 125 | 16 | 649 | 94 | 701 | 113 |
| INPUT DATA: | FER | 4 0 | ### #00# #SP | # | 111 | * | 153 | * | 138 | * | 121 | # | 121 | * | 111 | 4 |
| 2 | GROSS VEHICLE WEIGHT, t. TRACK PITCH, in. = 7.63 | icie | A E B | | 2006 x16 | 19. | 124 | 38. | 138727-138727-1 1892-1 | 57. | 127725.127725.1 1354.1 | 76. | 649 | 94. | 701. | 113 |
| INPUT DATA: | GRDSS VEHICLE WEIGHT, tons TRACK PITCH, in. = 7.63 | Eff | essessessessessessessessessessessessess | # 89# | 12 | 1.5# 19.# 19.# 398.# 243 | 153424.[53424.] 2610.] | 3.0# | 138 | * | 127 | 6.0# 76.# 76.# 1593.# 974.# | 121 | 7.54 94.4 94.4 1991.4 1217.4 | 117 | 44 |
| | * | | A X H | H | | 1.5 | | 3.0 | | 4.54 | | 6.0 | | 7.5 | | 9.0 |

| GEAR LOADS MAX #INNER VEH #SPROK | | BOUTER # PROP #SPROK #HOTOR | PROP * | 4AXIMUM TRACTIVE # PROP #OUTER #I #MOTOR # 6 # | NNER B | TER # | ~ ~ | OUTER # | #INNER # | OUTER 4 | NNER | # F # # | NN ER | #STEER # | 1 | ¬ | * * | * * | _ |
|--|-------------|--------------------------------|--------------|--|-----------|--------|---------|--------------------------|------------|----------------------|--------|-----------|-----------------|----------|----------|------------|--------|---------|--------|
| # | N P M | N P H | # RPM # | | RPM * | RP# # | RPM # | RP# | RPM # | RPM # | RPH # | RPM # | RPH | RPH | M 9 | # RP R | * | * | RPH |
| == | txlbs | TORQUE | TORQUE | TORQUE TORQUE TORQUE TORQUE | TORQUE | W | TORQUE! | TORQUE TORQUE ftxlbs | | TORQUE!T ftxlbs!f | ORQUE | TORQUE! T | TORQUE) TORQUE! | TORQUE | TORQUE | TOR ftx | S t | QUE IT | TORQUE |
| 10.54 | 10.54 132.4 | | 2788. | 132.4 2788.4 1704.0 | 1704.# | *.0 | 0 | \$29. | \$29.# | 264.# | -264.# | **0 | **0 | 0 | **0 | | * | * | 0.* |
| = | 3153. | 113153-113153.1 | 642. | -8- | -8- | 2664.1 | 2664.1 | 3338.1 | 3338.1 | -16. | -16.1 | 9717.1 | 9717.1-1 | 1638.1 | 2680-120 | 120992 | .1 86 | 35.1- | 2256. |
| 12.0# | 12.0# 151.# | | 3186.4 | 151.4 3186.4 1947.4 | 1947.4 | 0.4 | **0 | ***09 | \$ * \$ 09 | -302.# | -305- | | **0 | 0.0 | 0.4 | 0 | 4 | 4.0 | **0 |
| = | 1572.1 | 111572.111572.1 | 565.1 | -7.1 | -7.1 | 2344. | 2344.1 | 2936.1 | 2936.1 | -14.1 | -14.1 | 8549.1 | 8549.1-1 | 1441.1 | 2358. | .118470. | .1 75 | 97.1-1 | 985.1 |
| 13.54 | 13.54 170.4 | 170.8 | 3585.4 | 170.4 3585.4 2191.4 | **1917 | ***0 | **0 | **089 | \$*089 | -340* | -340*# | **0 | *** | **0 | 0. | | 4 | * | 0.* |
| ı | 0343. | 110343.110343.1 | 505.1 | -6.1 | -6-1 | 2095.1 | 2095.1 | 2625.1 | 2625.1 | -13.1 | -13.1 | 7641.1 | 7641.1- | -1288.1 | 2107. | . 116508 | 1.1 67 | 90-1-1 | 174.1 |
| | 189. | | 3983.\$ | 189.4 3983.4 2434.4 | 2434.\$ | 0.4 | *** | 155.# | 155.\$ | -378.# | 1 | **0 | ***0 | **0 | 9.0 | • | | **0 | 0.4 |
| - | 9360.1 | 9360-1 9360-1 | 457.1 | -6-1 | -6-1 | 1896.1 | 1896.1 | 2375.1 | 2375.1 | -12.1 | -12.1 | 6915.1 | 6915-1-11 | 1165.1 | 1907. | -114939 | .1 61 | 45.1-1 | 605. |
| 16.5# | 208.4 | | 208.4 4381.4 | 2677. | 2677.\$ | *** | **0 | 831.4 | 831.4 | -415.4 | -415.# | **0 | 4.0 | .0 | 0. | 0 | | **0 | 0.4 |
| 1 | 8555.1 | 80 | 418.1 | 1 | -5-1 | 1733.1 | 1733.1 | 2171.1 | 2171.1 | -111-1 | -11:- | 6320.1 | 6320-1-1 | 1065.1 | 1743. | 43.113655 | . 56 | 17.1-1 | 467.1 |
| 18.0* | 227.4 | 1 227.4 | | 4779.4 2921.4 | 2921.# | ***0 | 0.4 | **906 | \$ · 906 | -453.# | -453.4 | **0 | 0.4 | *** | **0 | 0 | | **0 | *.0 |
| - | 7885.1 | - | | -5.1 | -5.1 | 1597.1 | 1597.1 | 2001.1 | 2001.1 | -10.1 | -10.1 | 5825.1 | 5825.1 | -982-1 | 1607-112 | 58 | 5.1 51 | 1-1-11 | 352.1 |
| 19.54 | 246.# | | 5178.0 | 246.4 5178.4 3164.4 | 3164.# | **0 | ** | 982. | \$85. | -491.4 | 1 | * 0 | 0.4 | **0 | 0.4 | ٥ | * | **0 | 0.0 |
| - | 7277.1 | 7277.1 7277.1 | 355.1 | + | -4- | 1474.1 | 1474.1 | 1847.1 | 1847.1 | -9.1 | 1.6- | 5376.1 | 5376.1 | -906- | 1483. | .111615 | 14 1. | 78.1-1 | 248. |
| 21.0# | 264.# | 264.\$ | 5576.4 | - | 3408.4 | **0 | **0 | 1058.* | 1058. | -529. | -529-# | ***0 | 0.4 | 0 | * | 0 | 4 | **0 | 0.* |
| | 6756.1 6 | 6756.1 6756.1 | | 1.4- | 7 | 1368.1 | 1368. | 1714.1 | 1714.1 | -8-1 | -8- | 4991.1 | 4991.1 | -841.1 | 1377. | .110783 | - | 36-1-1 | 159. |
| 22.54 | 283.4 | 283.4 | | 5974.# 3651.# | 3651.4 | *** | 0.4 | 1133.# | 1133.# | -567. | -567.# | **0 | **0 | *** | 0.0 | | D. 4 | **0 | 4.0 |
| - | 6305.1 | 6305.1 | 308.1 | 7 | -+ | 1277.1 | 1277.1 | 1600.1 | 1600.1 | -8-1 | - 8- | 4658.1 | 4658.1 | -785-1 | 1285. | -110062 | 2.1 41 | 39.1-1 | 081.1 |
| \$0.42 | 302.4 | 302.4 | 6373. | 3894.4 | 3894.# | 4.0 | **0 | 1209.# | 1209.# | 604.4 | +-+09- | **0 | 4.0 | *** | 0.4 | 0 | | **0 | 4.0 |
| - | \$ 909.1 | 5909. | 289.1 | İ | -3.1 | 1197.1 | 1197.1 | 1500-1 | 1500-1 | -7.1 | -7.1 | 4366.1 | 4366.1 | -736.1 | 1204.1 | 943 | 2.1 38 | 80.1-1 | 014.1 |
| 25.54 | 321.* | 321.4 | 6771.* | 4138.4 | 4138.* | 0.4 | ***0 | 1284.# | 1284.4 | -642.# | -645.# | **0 | 4.0 | 0.4 | *** | 0 | * | **0 | 0.4 |
| - | 5561.1 | 5561-1 5561-1 | 272.1 | -3.1 | -3.1 | 1126.1 | 1126.1 | 1411.1 | 1411-1 | -1.1 | -1- | 4108.1 | 4108.1 | -692.1 | 1133. | 1 8875 | 5.1 36 | - 1-159 | 954. |
| 27.0# | 340*# | | 340.# 7169.# | 4381.4 | 4381.4 | **0 | 0.* | 1360.# | 1360.4 | -680. | -680- | **0 | | *** | **0 | | ***0 | #*0 | 0.4 |
| -(| 5251. | 5251-1 5251-1 | 256. | -3.1 | -3.1 | 1063.1 | 1063.1 | 1332.1 | 1332.1 | | -7.1 | 3879.1 | 3879.1 | 1-459- | 1.0701 | 8380. | - | _ | -901. |

| 1970-06 | GEAR MAX W | GEAR LOADS (MAX #INNER : | GEAR LOADS DURING MAXIMU MAX #INNER #DUTER # PROP VEH #SPROK #MOTOR | #AXIMUM TRACTIVE # PROP #OUTER # | # TRAC | ER #II | IVE EFFORT DINNER #0 * 8 \$ | UTER | INNER | OUTER | #INNER | DATE: NO. | • | 14-AUG-8 #INNER #0 # E # | Stilo UTER F | #INNER | *STEER | * * | * * | 7 | ** | * * | | * * |
|--|---------------|------------------------------|---|----------------------------------|--------|--------|-----------------------------------|------|--------|------------------|--------|-----------|---------|--------------------------------|--------------------|--------|----------|--------|-------|------------------|---------|-----------|--------|-----|
| 1935-0-355-0-355-0-4625-0-0-0-11000UE 1947-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1 | # HdW | | | * 89 | # RP | * | * | E E | a g | 8 P 8 | 8 | ox. | # | | | - | # RPM | * | RPH # | 2 | * | # H | E E | * |
| 4973-1 4973-1 243-1 -3-1 -3-1 1007-1 1262.1 1262.1 1262.1 -6-1 -6-1 3674.1 3674 4973-1 4973-1 243-1 -3-1 -3-1 1007-1 1007-1 1262.1 1262.1 -6-1 -6-1 3490.1 3490 4724-1 4724-1 231-1 -3-1 -3-1 937-1 957-1 1199-1 1199-1 -4-1 -6-1 -6-1 3490.1 3490 4724-1 4724-1 231-1 -3-1 -3-1 937-1 957-1 1199-1 1199-1 -6-1 -6-1 3490.1 3490 4498-1 4498-1 420-1 220-1 -3-1 937-1 937-1 1199-1 1199-1 -6-1 -6-1 3490.1 3490 4498-1 4498-1 420-1 220-1 -3-1 -3-1 911-1 911-1 1141-1 -6-1 -6-1 323-1 3323-1 3223 | | TORQUE | TORQUE | 1 tex 1b | S Iftx | | LU M | - F | TORQUE | OR QUE tx 16s | | 1 = E | F = - | | TORQUE | TORQUE | TORQUE | 111 | W 8 | TORQUE ftx1bs | | TORQUE IT | TORQUE | 1 |
| 378.4 4973. 243. 243. -3. -3. 1007. 1007. 1262. 1262. -6. -6. -6. 3674. 3674. 378.4 378.4 378.4 378.4 378.4 377.4 4724. 4724. 231.1 -3. -3.1 -3.1 977. 957. 1199. 1199. -6. -6. 3490. 3490. 349 | 28.54 | | | # 7568 | | - | 625. | 0 | 0 | 1435 | 143 | # | * | 718 | | • | * | # 0 | **0 | 0 | *** | ** | • | * |
| 378.8 378.4 7966.4 4868.4 4868.4 0.4 0.4 1511.4 1511.4 -755.4 -755.4 0.4 0 374.1 4724.1 231.1 -31 -3.1 977.1 957.1 1199.1 1199.1 -6.1 -6.1 3490.1 3490 377.4 3724.1 4724.1 231.1 -3.1 -3.1 977.1 957.1 1199.1 166.2 -753.4 -793.4 0.4 0 4498.1 220.1 -3.1 -3.1 911.1 911.1 1141.1 1141.1 -6.1 -6.1 -6.1 3323.1 3323 415.4 415.4 8762.4 5355.4 535.4 535.4 635.4 0.4 0.4 1662.4 1662.4 -831.4 -831.4 0.4 0 424.5 415.4 8762.4 5355.4 5355.4 5355.4 0.4 0.4 1662.4 1662.4 -863.4 -863.4 0.4 0 424.5 434.4 9161.4 5598.4 5598.4 0.4 0.4 1662.4 1662.4 -863.4 -863.4 0.4 0 434.5 434.4 9161.4 5598.4 5842.4 5842.4 0.4 0.4 10.4 1131.4 1131.4 -5.1 -5.1 3033.1 3033 435.1 3933.1 3933.1 192.1 -2.1 -2.1 77.1 797.1 998.1 998.1 -5.1 -5.1 2906.1 2906.1 2906 472.4 472.4 472.4 9957.4 6085.4 6085.4 0.4 0.4 1983.4 1889.4 -944.4 -944.4 0.4 0.4 0.4 0.4 1983.1 3134.1 3158.1 177.1 -2.1 -2.1 773.1 773.1 972.1 998.1 -5.1 -5.1 2020.1 2906.1 2906 472.4 472.4 472.4 491.4 1036.4 6352.4 6352.4 0.4 0.4 0.4 1964.4 1964.4 -962.4 -962.4 0.4 0.4 0.4 191.1 177.1 -2.1 -2.1 763.1 763.1 965.1 966.1 966.1 -5.1 -5.1 2671.1 2571.1 2571.1 377.1 170.1 -2.1 -2.1 770.1 1881.1 -6.1 -4.1 256.1 257.1 | - | 4973. | | 1 | _ | -3.1 | | 2 | 1001. | 1262 | 1 ~ | - | 1-9- | | 3674. | İ | -61 | 9.1 | 013.1 | 1938 | 8.1.32 | 265.1 | -953. | - |
| 415.4 4724. 231. -3. -3. 957. 957. 1199. 1199. -6. -6. 3490. | 30.0# | | | 4 7966 | * 48 | | 968 | | • | 1511 | - | 1- 4. | 55.4 | 755 | | 0 | | *** | 0.4 | 0 | **0 | 0 | ò | |
| 493.4 934.6 5111.4 5111.4 0.4 0.4 1586.4 1586.4 1793.4 -793.4 0.4 0.4 0.4 1566.4 1793.4 -793.4 -793.4 -793.4 -793.4 -6.1 -6.1 -6.1 3323.1 3323.1 3323.1 3323.4 4323.4 415.4 415.4 816.2 -6.6 13.1 11.1 11.1 11.1 -6.1 -6.1 3323.1 3323.4 4323.4 415.4 816.2 816.2 1662.4 -6 | - | | 1 4724. | , | i | -3.1 | -3.1 | 6 | 957.1 | t | = | - | -6-1 | -6.1 | 3490. | ă. | -58 | 8.1 | 962.1 | 1539.1 | i | 3101.1 | -810- | - |
| 4458. 4458. 420. 420. 420. 421. 420. | 31.54 | | | | | | 111 | | 0 | 1586 | - | • | ** | 93 | 0 | 0 | | *** | *** | 0 | **0 | **0 | • | * |
| 415.4 415.4 8162.4 5355.4 5355.4 0.4 0.4 1662.4 1662.4 1662.4 1631.4 -831.4 -831.4 0.4 0.4 1642.4 1652.4 1662.4 16 | _ | | 1 4498. | | | -3.1 | (4) | 911 | | 1141 | 1 | | -6.1 | -6-1 | 323 | 323 | 1.5 | 1.09 | 916.1 | 1119 | .1 29 | 53.1 | -112. | - |
| 434.# 434.# 9161.# 5598.# 5598.# 0.# 0.# 1737.# 1737.# -669.# -669.# 0.# 0 4105. 4105. 201. -2. -2. 831. 831. 1042. 1042. -5. -5. 3033. 3033 453.# 453.# 9559.# 5842.# 5842.# 0.# 0.# 1813.# 1813.# -906.# -906.# -906.# 0.# 0 3933. 3933. 3933. 192. -2. -2. 797. 797. 998. 998. 998. -5. 20. 206.# 0.# 0 3768. 3768. 184. -2. -2. 797. 797. 998. 998. 998. -5. 200.# 0.# 0 365. 3768. 3768. 184. -2. -2. 763. 763. 763. 956. 956.# -906.# -906.# 0.# 0 3655. 3615. 177. -2. -2. 763. 763. 956. 956. -5. 5. 2784. 2784. 491.# 10356.# 6328.# 6328.# 0.# 0.# 0.# 10464.# -902.# -902.# -902.# 0.# 0 3615. 3615. 177. -2. -2. 772. 772. 772. 917. 917. 5. -5. 2671. 2561. 2591. 2379. 2379. 2379. 2379. 2379. 2379. 2379. 2379. 2295. 2295. 2295. 2295. 2295. 2595. 2 | 33.04 | | | # 8762 | | * | 355. | • | ٥ | 1662 | | 1 | 31.4 | 831 | • | | * | **0 | *.0 | • | | 0 | Ö | # |
| 453.* 434.* 9161.* 5598.* 5598.* 0.* 0.* 1737.* 1737.* -869.* -869.* 0.* 0.* 0.* 105.1 4105.1 201.1 -2.1 -2.1 831.1 1042.1 1042.1 -5.1 -5.1 -5.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3033.1 3933.1 3933.1 3933.1 392.1 -2.1 -2.1 797.1 797.1 998.1 998.1 -5.1 -5.1 2906.* 0.* 0.* 0.* 3933.1 3933.1 3933.1 192.1 -2.1 -2.1 797.1 797.1 998.1 998.1 -5.1 -5.1 2906.* 0.* 0.* 0.* 3768.1 3768.1 186.1 -5.1 -5.1 2906.* 0.* 0.* 0.* 0.* 3768.1 3768.1 186.1 177.1 -2.1 -2.1 732.1 732.1 956.1 956.1 -5.1 -5.1 2784.1 2784.1 2784.1 3474.1 3474.1 170.1 -2.1 -2.1 732.1 732.1 917.1 917.1 -5.1 -5.1 2571.1 2571.1 2571.1 3474.1 3474.1 170.1 -2.1 -2.1 7704.1 704.1 881.1 881.1 -4.1 -4.1 256.1 256.1 256.1 256.1 3260.1 157.1 -2.1 -2.1 677.1 677.1 848.1 848.1 -4.1 -4.1 256.1 246. | - | • | 1 4293. | 1 | | -3.1 | 3 | 8 69 | 69 | 1089. | 2 | _ | -5.1 | -5.1 | 3171. | ł | -5 | 35.1 | 875.1 | 6851 | .1 28 | 2818.1 | -736. | - |
| 453.4 453.4 1955, 201.1 -2.1 -2.1 831.1 831.1 1042.1 1042.1 -5.1 -5.1 3033.1 3033.4 3033.4 453.4 453.4 453.4 453.4 5842.4 0.4 0.4 1813.4 1813.4 -906.4 -906.4 -906.4 0.0 0.9 3933.1 3933.1 192.1 -2.1 -2.1 72.1 797.1 998.1 998.1 -5.1 -5.1 2906.1 2906 472.4 472.4 9957.4 6085.4 6085.4 0.4 0.4 1964.4 1964.4 -944.4 -944.4 0.4 0.4 0.4 491.4 491.4 10356.4 6328.4 6328.4 6328.4 0.4 0.4 1964.4 1964.4 -982.4 -982.4 0.4 0.4 1964.4 1964.4 -982.4 -982.4 0.4 0.4 1964.1 3168.1 177.1 -2.1 -2.1 732.1 732.1 977.1 917.1 -5.1 -5.1 2571.1 2571.1 2571.1 2571.1 3474.1 170.1 -2.1 -2.1 72.1 732.1 732.1 977.1 917.1 -5.1 -5.1 2571.1 2571.1 2571.1 2571.1 3474.1 170.1 -2.1 -2.1 72.1 704.1 881.1 881.1 -4.1 -4.1 2566.1 2566.1 2566.1 2566.1 2566.1 3343.1 3343.1 163.1 -2.1 -2.1 704.1 677.1 848.1 848.1 -4.1 -4.1 2469.1 2469.1 2469.1 2469.1 348.4 548.4 1550.4 7059.4 0.4 0.4 0.4 2191.4 1195.4 -1095.4 1035.4 0.4 0.4 2250.1 3260.4 123.4 133.4 143.1 157.1 -2.1 -2.1 652.1 652.1 817.1 8181.1 -4.1 -4.1 2469.1 24 | 34.54 | | | | | | 598. | • | 0 | 1737. | | # | | 869 | • | • | * | #*0 | 0.4 | F. | **0 | **0 | ö | 7 |
| 453.4 \$53.4 9559.4 \$842.4 \$682.4 \$0.4 \$0.4 \$1813.4 \$1813.4 \$-906.4 \$-906.4 \$0.4 \$0.8 \$0.8 \$333.1 \$3933.1 \$192.1 \$-2.1 \$-2.1 \$77.1 \$77.1 \$998.1 \$998.1 \$-5.1 \$-5.1 \$2906.1 \$906.1 \$998.1 \$3768.1 \$3933.1 \$192.1 \$-2.1 \$-2.1 \$77.1 \$77.1 \$998.1 \$998.1 \$-5.1 \$-5.1 \$2906.1 \$2906 \$472.4 \$492.4 \$-944.4 \$0.4 \$0.4 \$0.4 \$0.4 \$186.1 \$966.1 \$966.1 \$-5.1 \$-5.1 \$2784.1 \$2784.4 \$177.1 \$-2.1 \$-2.1 \$732.1 \$732.1 \$977.1 | t | 4105. | 1 4105. | • | _ | -2.1 | 2. | 831 | 31 | 1042 | - | - | -5.1 | 1 | 33 | | 1 -511 | 1.1 | 826.1 | 6552. | .1 26 | 95.1 | -704. | - |
| 3933. 192. -2. -2. 797. 1998. 998. 998. -5. -5. 2906. 290. 472.4 472.4 472.4 472.4 1889.4 1889.4 -5. -5. 294.4 90.4 3768. 3768. 376. -2. -2. 763. 763. 763. 956. 956. -5. -5. 284.4 278.4 491.4 491.410356.4 6328.4 6328.4 0.4 0.4 0.4 1964.4 1964.4 -982.4 -9.1 278.1 278.1 510.4 491.410356.4 6372.4 6372.4 732.1 732.1 917.1 -5.1 -5.1 2671.1 <td>36.0#</td> <td></td> <td></td> <td>* 9559</td> <td></td> <td>4</td> <td>5842.</td> <td>•</td> <td>•</td> <td>1813.</td> <td>-</td> <td></td> <td>#</td> <td>906</td> <td></td> <td></td> <td></td> <td>**0</td> <td>0.4</td> <td></td> <td>**0</td> <td>* 0</td> <td>•</td> <td>*</td> | 36.0# | | | * 9559 | | 4 | 5842. | • | • | 1813. | - | | # | 906 | | | | **0 | 0.4 | | **0 | * 0 | • | * |
| 472.# 472.# 9957.# 6085.# 6085.# 0.# 0.# 1889.# 1889.# 1889.# -944.# 0.# 0.# 0.# 3168. 3768. 184. -2. -2. 763. 763. 956. 956. -5. -5. 2784 | - | 1 | 1 3933. | • | 1 | -2.1 | -2.1 | 1 | 197. | 986 | _ | | -5.1 | -5.1 | • | ~ | * | 1.06 | 801.1 | 6278 | 8-1 25 | 182.1 | -675. | - |
| 3768. 3768. 1368. | 37.54 | | | 1566 \$ | | | \$082° | 0 | 0 | 1889. | - | | 4 | 944 | | | | **0 | 0.4 | | | 0.0 | | - |
| 491.# 491.#10356.# 6328.# 6328.# 6328.# 0.*# 1964.# 1964.# 1964.# -982.# -982.# 0.# 0 3615. 3615. 177. -2. -2. -2. 732. 732. 732. 917. 917. 917. -5. -5. 2671. | - | 3768. | 1 3768. | • | | -2.1 | 2 | | 763. | 56. | 6 | 1.5 | -5.1 | 1 80 | 2784 | 1 2 | * | 69.1 | 768.1 | 6014. | .1 24 | 14.1 | -646.1 | |
| 3615.1 3615.1 177.1 -2.1 -2.1 -2.1 732.1 732.1 917.1 917.1 -5.1 -5.1 2671.1 | #0.9E | | | #10356 | | | 6328. | 0.* | | 1964 | - | | 82.4 | 985 | | | | *** | .0 | | * | 0.4 | 0 | 7 |
| 510.4 510.410754.4 6572.4 6572.4 0.4 0.4 2040.4 2040.4 1020.4 1020.4 0.4 0.4 0.4 0.4 0.4 1020.4 1020.4 0.4 0.4 0.4 1040.4 1020.4 1020.4 1020.4 0.4 0.4 1040.4 1040.4 1020. | | 3615. | 1 3615. | 11 1. | | -2.1 | -2- | 32. | - | 917. | _ | 1.1 | | 100 | 56 | ~ | 1 | 1.05 | 737.1 | 5770. | 1 2 | 373.1 | -620. | • |
| 3474. 3474. 170. -2. -2. -2. 704. 704. 881. 881. -4. -4. 2566. 2566. 2566 599.4 529.4 11152.4 6815.4 6815.4 0.4 0.4 2115.4 2115.4 -1058.4 -1058.4 0.4 0.4 0.4 3343. 3343. 3343. 163. -2. -2. 677. 677. 848. 848. 648. -4. -4. 2469. 2469. 2469 598.4 548.4 11550.4 7059.4 7059.4 0.4 0.4 2191.4 1191.4 1195.4 -4. -4. 2319. 2379 597.4 567.4 11949.4 7302.4 7302.4 0.4 0.4 2266.4 2266.4 2266.4 -1133.4 -1133.4 0.4 0.4 0.4 1106. 3106. 3106. 312. -2. -2. -2. 629. 629. 788. 788. 788. -4. -4. 2295. 2 | 40.54 | | | *10754 | .4 65 | | 572. | • | | | | 1-4-10 | -\$-020 | 020 | 0 | | * | **0 | * | | *** | | 0.4 | - |
| 3343.4 3343.4 163.4 -2.1 -2.1 677.4 677.1 848.4 848.4 -4.1 -4.1 2469.4 2469 548.* 548.*11550.* 7059.* 7059.* 0.* 0.* 2191.* 2191.* -1095.* -1095.* 0.* 0 3220.4 3220.4 157.4 -2.4 -2.4 652.4 652.1 817.4 817.4 -4.1 -4.1 2379.4 2379 567.* 567.*11949.* 7302.* 7302.* 0.* 0.* 2266.* 2266.* -1133.* -1133.* 0.* 0 3106.4 3106.1 152.1 -2.4 -2.4 -2.4 629.4 629.4 788.1 788.1 -4.1 -4.1 2295.1 2295. | | • | 1 3474. | 1 176 | | -2-1 | -2-1 | 1 | | 881 | _ | | | 7 | 25 | 25 | -1- | 3.1 | 708.1 | 55 | 44.1 22 | 2281.1 | -596- | |
| 3343. 3343. 163. -2. -2. 677. 677. 848. 848. -4. -4. 2469. 2469 548.* 548.*11550.* 7059.* 7059.* 0.* 0.* 0.* 2191.* 2191.*-1095.*-1095.* 3220. 3220. 3220. 157. -2. -2. 652. 652. 817. 817. -4. -4. 2379. 2379 567.* 567.*11949.* 7302.* 7302.* 0.* 0.* 2266.* 2266.*-1133.*-1133.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0 | 42.00 | | | *11152 | | | | • | | 2115 | | 5.4-10 | 58.4 | 0 | | | | 4.0 | .0 | • | * | **0 | *.0 | - |
| 548.* 548.*11550.* 7059.* 7059.* 0.* 0.* 0.* 2191.¢ 2191.¢-1095.*-1095.* 0.* 0.* 0.3220. 3220. 157. -2. -2. 652. 652. 817. 817. -4. -4. 2379. 2379. 5379. 557.* 567.*11949.¢ 7302.* 7302.* 0.* 0.* 2266.¢ 2266.¢ -1133.*-1133.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0.* 0 | _ | | 1 3343. | : | | -2.1 | -2.1 | 9 | 677. | 848 | ! | 1. | | -4.1 | 1 | 24 | .1 -416. | 1.9 | 681.1 | 533 | 5.1 21 | 1.461 | -573. | - |
| 3220. 3220. 157. -2. -2. 652. 652. 817. 817. -4. -4. 2379. 2379. 567.# 567.#11949.# 7302.# 7302.# 0.# 0.# 2266.# 2266.#-1133.#-1133.# 0.# 0. 3106. 3106. 3106. 152. -2. -2. 629. 629. 788. 788. -4. -4. 2295. 2295. | 43.50 | | | *11550 | 01 4.0 | | 1059.4 | 0 | 0 | 2191. | 4 | 1-4. | \$ -56 | | 0 | • | * | # 0 | **0 | | **0 | *** | **0 | |
| 567.* 567.*11949.¢ 7302.¢ 7302.¢ 0.¢ 0.¢ 2266.¢ 2266.¢-1133.¢-1133.¢ 0.¢ 0. 3106. 3106. 152. -2. -2. 629. 629. 788. 788. -4. -4. 2295. 2295. | | 3220. | 1 3220. | 151 | | -2.1 | -2-1 | 652. | • | 811 | | - | | | ı | , | - | -401.1 | 656.1 | 5140 | 40.1 21 | 2114.1 | -552. | • |
| 152.1 -2.1 -2.1 629.1 629.1 788.1 788.1 -4.1 -4.1 2295.1 | 45.04 | | | *11945 | 1.0 73 | | 302 | 0 | • | 2266 | | - 4 | 33.# | 133. | | | * | **0 | | 0 | * | | **0 | - 1 |
| | | 3106. | 1 3106 | 1 152 | | -2.1 | -2- | 9 | | 788 | ~ | 1.6 | | 7 | | • | 13 | 87.1 | 633.1 | 495 | 8.1 20 | 2039.1 | -533 | 3. |

| * * * | | ***** | | ******** *OUTER * | # # | txlbs | ** | 194801 | 4.0 | 155541 | **0 | 110041 | **0 | -84721 | #*0 | 15569- | **0 | -59431 |
|---|-------------|---|--|---|---------------------------------------|---|----------------------------|---|----------------|--|----------------|-----------------------------|-------------------------|------------------------------------|---------------|----------------------|---------------------|-----------------------------|
| esetetetetetetetetetetetetetetetetetete | | 40.0 MAXIMUM VELOCITY, mph = 45.0 ENGINE NET HP. = 880.0 NUMBER OF SPRUCKET TEETH = 11 ««################################## | | dfebeskestestestestestestestestestestestesteste | # | TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE!TORQUE! ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs!ftxlbs! | 4.0 | 6355-1-1313-1-1313-1-7058-1-7058-117541-117541-1-1912-1-1812-1-194801-19480 | **0 | 5075.1-1048.1-1048.1-5636.1-5636.114006.114006.1-1447.1-1447.1-155541-155541 | 0 | 9909-1-1024-1-1024-1-11004 | **0 | -84721 | ** 0 | -69551 | **0 | -59431 |
| * * * | | • | | * F & | # # # # # # # # # # # # # # # # # # # | ORQUE | +-69- | 1812- | -137.4 | 1447.1- | -206.# | 1024.1- | -274.# | -788.1 | -343.# | -647.1 | -411.4 | -553.1 |
| * * * | | *** | | # F # | # KGE | ORQUE!! | #*69- | 1912.1- | -137.4 -137.4 | 1447.1- | -206.# -206.# | 1024.1- | -274.# | -788.1 | -343.4 | -647.1 | -4111. | -553.1 |
| * * * * | | 0. | | ************************************** | K | ORQUE!! | 52.8 | 7541.1- | 104.# | 4006-1- | 156.4 | -1-6066 | 208.# | 1629.1 | 261.# | 6263.1 | 313.4 | 5352.1 |
| 8-JUN-85 | | **** | | ###################################### | * | ORQUEIT | 52.4 | 7541.11 | 104.4 | 4006.11 | 156.# | 1.6066 | 208.# | 1 | 261.# | 6263.1 | 313.4 | 5352.1 |
| 110N: 8- | | NET HP. | | ************************************** | * | ORQUEIT tx1bs1f | **0 | 7058.11 | .0 | 5636.11 | **0 | • | 0.4 | 3070.1 | **0 | • | **0 | 2154.1 |
| ************************************** | | ENGINE | I R SET-UP | ###################################### | # dd | TORQUE!I | *.0 | 1058.1- | 0.4 | -1-9695- | **0 | 3987.1- | **0 | -3070.1- | **0 | -469.1-2520.1-2520.1 | **0 | -401. [-2154. [-2154.] |
| ###################################### | | 45.0 * 11 ********** | HOTO | ************************************** | # RPM | TORQUE | -189.4 -189.4 | -1313. | -379.# -379.# | -1048. - | -568. | -742.1 -742.1-3987.1-3987.1 | -757.4 | -571.1 -571.1-3070.1-3070.1 7629.1 | +-946- | -469.1 | -1136.# | -1.01 |
| BY: RIC RUN | | TEETH = | CONFIGURATION THIN DRIVE HOT | ###################################### | M d | TORQUE! ftx1bs1 | | -1313.4 | | -1048.1 | -568.# | | -757.# | | - | 1-694- | 863.4-1136.4-1136.4 | -401.1 |
| | | VELOCITY, mph = F SPRUCKET TEETH \$4444644444444 | *. | etttt | * RPH * | TORQUE | 144.# | | 288. | | 432.0 | 3590.1 | \$75.# | 2764.1 | 719.# | 2269.1 | | 1939. |
| 1110N 1110N | | MAXIMUM VEL NUMBER OF SI \$\$\$\$\$\$\$\$ | | ###################################### | H GR H | TORQUE | 4 144.8 | 6355.1 | ₹ 288. | 1 5075-1 | ¢ 432.# | 1 3590.1 | \$ 575.# | 308.1 2764.1 2764.1 | 4 719.4 | 253.1 2269.1 | # 863.# | 216.1 1939.1 1939.1 -401.1 |
| stattatatatata EFFORT CONDITION SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS | | NUMB | Botor | #00TER : | A RPR | TURQUE | # -452# | 1.801 | \$\$06- a | 1.595 | 4 -1356# | 1.000 | * -1808# | | # -2260# | | * -2712* | |
| | | 0.04 | mopolar -85 | SARBBOOK SINNER | * | | #554- | 1 708. | * -904 | 1 565.1 | 4 -1356# | 400.1 | -1808¢ | 308. | * -2260* | 253. | +-2712# | 216.1 |
| TRACTI | | tons = | for Ho 20-HAY | ****************** | # da | TORQUE | 396.# 396.# | -808- | 791.4 791.4 | -646.1 -646.1 | 1187.0 1187.0 | -457-1 -457-1 | 1582.4 1582.4 | -352.1 -352.1 | 1978.4 1978.4 | -289-1 -289-1 | 2374.# 2374.# | 1 -247. |
| MAXINUM | | HEIGHT, n. = 7. | siedler | INNER MOTOR | # d | TORQUE | 396. | -808- | - 1 | | | | 1582. | -355. | | | | -247. |
| 每年存在存在存在存在存在存在存在存在存在存在存在存在存在存在存在存在存在 GEAR LOADS DURING MAXINUM TRACTIV 存在存在存在存在存在存在存在存在存在存在存在存在存在存在 | INPUT DATA: | GROSS VEHICLE MEIGHT, tons a TRACK PITCH, in a 7.63 | Efficiency data for Homopolar by Gene Siedler 20-MAY-85 | estatestatestatestatestatestatestates hax einner edutere inner eduter e VeH esprok esproke motor emotor e | MPH # RPM # RPM # RPM | TORQUE | 1.54 19.4 19.4 396.4 396.4 | 148413-1484121 -809-1 -809-1 | 3.04 38.4 38.4 | 138656.1386551 | \$ 57.9 | 127349. [27349] | 76.4 76.4 1582.4 1582.4 | 121057-1210561 | 94.4 94.4 | 117285-1172851 | 9.0# 113.# 113.# | 114772. 14771 -247. -247. |
| R LOADS | ñ l | GROSS Y TRACK F | w D | ###################################### | * RPH | TORQUE | 5# 19. | 148413. | 38. | 138656. | 4.54 57.4 57.P | 127349. | #! | - | # 1 | _ | 113. | 114772. |
| GEAG | | ** | | #### MAX VEH | How | | 1.5 | | 3.0# | | #5.4 | | 9.0 | | 7.5# | | 9.0 | |

| # # | # | UE | 4 | 0 | # | 8 | * | 0 | 0 | 6761 | 4.0 | 541 | * 0 | 96 | * | 80 | 4.0 | 4.4 | 9.0 | 671 | **0 | 121 | 0.4 | 14. | | 511 |
|---|--------|---------------------------------------|--------------|----------------|-----------|----------------|---------------|----------------|------------|--------------|---------|--------|-------------|--------------|-------------|---------------|-------|----------|--------|--------|-------------|--------------|-------------|--------------|-------------|--------------|
| G | E D | orgu tx1b | • | -514 | 0 | -4538 | ٦ | -4010 | Ü | -367 | _ | -33 | | -3086 | Ĭ | -284 | | -26 | - | -24 | Ī | -23 | _ | -21 | | -20 |
| #0UT | # | | | - | * | | # | ! _ | # 0 | - | * | = | *.0 | 1 | * | _ | | 1 | * | _ | | _ | 4 | - | * | 511 |
| INNER | × | 7 2 0 X | 0 | 5140 | 0 | 453 | 0 | 4070 | 0 | 3676 | 0 | 335 | • | 30861 | 0 | 2848 | 0 | 19992 | • | 2467 | 0 | 2312 | 0 | 217 | 0 | -205 |
| Z # # | # 80 | | * | - | * | _ | * | _ | | _ | 4 | _ | * | - | 4 | - | * | - | | - | * | - | * | - | 4 | - |
| TER | M | TORQUE | 80 | 478. | 549 | 422. | 517. | 379. | 8 | 342. | 25 | 312. | 823 | 87 | 892 | 265. | 960 | 246. | 620 | 230 | 097 | -215. | 166. | 202 | 234. | 16 |
| #001 | * | TOR | # | 7 | # | _ | 9- | _ | 4 | - | 1- # | _ | # | 1 -2 | 44 | | | _ | 1- | _ | 1-4 | - | 1-4 | - | 1 + | 1-1 |
| ~ | H | ROUE | 80. | 478. | .69 | -422. | -617. | 379. | 86. | 342. | 54.4 | 312. | 23. | 87. | . 761 | .65 | -09 | .94 | 029. | 230 | .760 | 215. | .99 | .20 | 34. | 91. |
| Z | # X | ftx ftx | 1 | 1 | - 2 | 1 | 1 | 7 | 9- | - | 1-1 | , | 8 4 | 2- 1 | 1 | 7-1 | 6- 4 | 7-1 | \$-10 | 1 | 7 | - | 4-11 | 7-1 | #-12 | 1-1 |
| œ | E | RQUE | 4.59 | 29. | 17.4 | 087.1 | 69.3 | 665. | 21.\$ | 3310. | 13.4 | 3021.1 | 25.# | 2779.1 | 78.4 | 2565. | 30.4 | 2381. | 82. | 22. | 34.# | 82. | 86. | 58. | 38 | 848-1 |
| OUT | RP | TORG | | 462 | * | 9 | • | 36 | · v | i | . 51 | ł | • | ı | • | 1 | - | • | - | 22 | 80 | 20 | 80 | 13 | 6 | 18 |
| | * | - × | ** | 9.1 | 17.4 | 87.1 | * 6 | 5.1 | 11.# | 310.1 | 13.4 | 1-1 | ** | 19.1 | # . 8 | 565. | 730.# | 11.1 | 782.* | 22.1 | 34.# | 082.1 | 36.4 | 58.1 | 38.4 | 8. |
| RNER | 2 | # # # | 36 | 462 | 7 | 804 | 46 | 366 | 5.2 | 331 | 51 | 3021 | 62 | 2779. | 67 | 256 | ~ | 2381 | 2 | 222 | • | 200 | • | 19 | • | 184 |
| * * | # | | * | 3.1 | **0 | 1.449 | | 5.1 | * .0 | 2.1 | ** | 5.1 | | 18.1 | * | 1.2 | **0 | 8 | | 94.1 | **0 | 8.1 | | 8.1 | * | 3.1 |
| OUTER | MA | ORQUE | | -1863 | | -164 | | -147 | | -133 | | -121 | | = | | -103 | | -95 | | -89 | | - 83 | | -78 | | -7. |
| * * | # | UE IT | # | - | **0 | -1-449 | **0 | 5.1- | 4.0 | 2.1- | **0 | 5.1. | * | 8 | # 0 | - | * 0 | | *** | - | **0 | 38.1 | **0 | | **0 | 3. |
| #INNE | RPH | t x 1 | | 1863 | | | | -141 | | -133 | | -121 | | | | -1032 | | -95 | | -89 | | -83 | | -78 | | -74 |
| | * | == | ** | 1-1-1 | * | 1-1-1 | # | | 3.8 | | * · · 2 | -1 -9 | * | 8-1-11 | * | 2.1- | \$0.0 | | ** | 6.1 | * 6 | | * * | -: | *: | 8. |
| CTER | # d | ORQUE | 32 | -346. | 51 | -306-1 | -1704.#-1704. | -27 | 69 | -24 | 208 | -226 | 2271 | -208 | 1942 | -19 | 26 | -17 | 2839 | -16 | 3029 | -156 | 3216 | -147 | 3407 | -13 |
| #00# # C | * | == | .4-1 | - | 1-4- | - | # | - | -#- | - | 4 | - | + | - | * | - | # | - | | - | -# | - | + | - | | 38.1 |
| S S S | E P | ORQUE | 325 | 346 | 514 | 306- | 104 | -274 | 1893 | -248 | 2082 | -226 | 2271 | -208 | 2451 | -192 | 2650 | -178 | 5838 | -166 | 3029 | -156 | 3218 | -141 | 3407 | -136 |
| Z # # | * | EITO SITT | -#-1 | - | -4-1 | - | | - | * | - | # | - | # | - | 4 | - | 4 | - | # | - | * | - | # | - | # | 9.1 |
| UTER | H | 20 × | 100 | 1677 | 151 | 1481 | 295 | 328 | 439 | 1199 | 582 | \$60 | 1726 | 1001 | 1870 | 929 | 014 | 863 | 2158 | 808 | 305 | 154 | 9 4 4 | 109 | 589 | 699 |
| no* | * | | * | _ | # | - | . 4 | _ | | - | # | - | | - | | - | -# 2 | - | | - | .# 2 | - | . 4 2 | - | . * 2 | - |
| NER B | H | OROUE tx1bs | 007 | 677. | 151 | .81. | 295 | 328. | 439. | 66 | 585- | 1094 | 1726.\$ | 1001 | 1870 | 929, | 2014 | 863. | 2158 | 805 | 302 | 754 | 2446 | 109 | 589 | 699 |
| Z # # | * | | - | - | 1* 1 | 11 | 1 *6 | - | # | - | _ | - | | - | | _ | | - | 1# 2 | - | 2 *5 | - | 6# 2 | - | 8 2 | - |
| TER | H | ROUE ×16s | 3164 | 187. | 3617 | 165. | 8 | 148. | 4521 | 134. | 4813* | 122. | \$425# | 112. | 5877* | 104. | 6329# | 96 | | 90 | 723 | 4 | 168 | 19 | 813 | 15. |
| #001 | œ | 12 | 4 | _ | 4 | _ | 9- #6 | _ | 1 | _ | • | - | T | _ | 1 | _ | | _ | 1 | _ | 1 | _ | - 1 | _ | 45 | _ |
| ~ œ | E | RQUE x1bs | 164 | . 87. | 3617 | 65. | 690 | 48. | 521 | 134. | 9134 | 122. | 5425# | 112. | 5877# | 104. | 6359 | 96. | 6781# | 90. | 7234# | 84. | 7686# | 79. | 8138 | 75. |
| N W | 8 | 124 | -3 | 1 | 1 | 1 | 1 | | 4 | | 1 | | 1 | _ | ï | _ | + | _ | 1 # | _ | * | _ | | _ | * | _ |
| 1 ex ex | × | 10 E | 169. | -213- | 3165. | -188. | 3561. | -169. | 3956. | -153. | 4352. | -139. | 4747. | -128. | 5143. | -118. | 5539. | -110. | 5934. | -102. | 6330. | -96- | 6725. | -96- | 7121. | -85- |
| #OUTER | # RP R | # # # # # # # # # # # # # # # # # # # | 12 4 | • | | 1 | | | | 1 | | i ' | | | | • | | | | • | | i | | | | 1 |
| G R R | | D S | 2769.4 2769. | -213.1 | 3165.4 | -188-1 | 3561.4 | -169.1 | 3956. | -153.1 | 4352.4 | -139-1 | 4147.0 | -128.1 | 5143.4 | -118.1 | 5539. | -110.1 | 5934.4 | -102-1 | 6330.¢ | -96- | 6725.4 | -90- | 7121.4 | 35 |
| IN | 2 | tx1 | | -2 | 31 | 7 | 35 | 7 | 39 | 7 | 43 | -13 | 7 | 7 | 51 | 7 | 55 | 7 | 53 | 7 | 63 | ' | 61 | ' | 11 | ' |
| #SPROK# HOTOR | * | 200 | | 151 | | 2 | | = | | 36 | 208.4 | 83361 | | 0 | | -62 | 264.# | 65721 | 283.4 | 61331 | 2.4 | 199 | | 1 | | |
| #OUTER# INNER #OUTER #SPROK# MOTOR #HOTO | RPH # | 1080 ft1b | 13 | 127 | 151 | 112 | 170 | 101 | 18 | 913 | | | 22 | 9 | 24 | 10 | | 1 | | 19 | 30 | 5746 | 32 | 5.4 | 34 | 50 |
| | * | TORQUE TORQUITORQUE TORQUE | 132.* 132.¢ | 112776-1127751 | 151.* 151 | 111279-1112791 | 170.4 170.4 | 110115-1101141 | 189.# 189. | 9137.1 91361 | 208.8 | 8337.1 | 227.4 227.4 | 1670.1 16701 | 246.4 246.4 | 1 7080-1 7079 | 264.# | 6573.1 | 283.4 | 6133.1 | 302.4 302.4 | 5746-1 57461 | 321.4 321.6 | 2404-1 54041 | 340.# 340.# | 5099.1 50991 |
| #INNER #SPROK | M d | ftx1 | = | 12776. | 15 | 1127 | | 10115. | | 913 | | 833 | | | | 708 | 26 | 657 | | • | | 1 | | | | • |
| GEAR LUADS MAX #INNER VEH #SPROK | # | 1 | 40 | ! | *0 | 1 | | 1 | 15.0# | - | 16.54 | - | 18.0* | - | 19.54 | - | 21.04 | 1 6573.1 | 22.54 | - | 24.0# | - | 25.54 | - | 27.04 | - |
| A X E | T. | • | 20 | | 12 | į | 13 | i | 15 | 1 | 16 | 1 | 1 8 | 1 | 19 | 1 | 17 | 1 | 22 | 1 | 24 | | 2.5 | • | 27 | i |

|TOROUE|TORQUITORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE|TORQUE| |ftxlbs|ftlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs|ftxlbs| 64.1 571.1 571.1 -118.1 -118.1 -634.1 -634.1 1577.1 1577.1 -163.1 -163.1 -17511 -17511 633.4 -131.1 -131.1 -703.1 -703.1 1748.1 1748.1 -181.1 -181.1 -19411 -19411 543.1 543.1 -112.1 -112.1 -603.1 +603.1 1500.1 1500.1 -155.1 -155.1 -16651 -16651 55.1 494.1 494.1 -102.1 -102.1 -549.1 -549.1 1365.1 1365.1 -141.1 -141.1 -15151 -15151 -93. | -502. | -502. | 1248. | 1248. | -129. | -129. | -1385 | -1385 | 48.1 433.1 433.1 -89.1 -89.1 -481.1 -481.1 1195.1 1195.1 -123.1 -123.1 -13271 -13271 43.1 383.1 383.1 -79.1 -79.1 -425.1 -425.1 1056.1 1056.1 -109.1 -109.1 -11721 -11721 -82.1 -82.1 -442.1 -442.1 1099.1 1099.1 -114.1 -114.1 -12201 -12201 GEAR LOADS AT MAXIMUM TRACKTIVE EFFORT CONDITION
RAX #INNER #OUTER #INNER #INNER #OUTER #INNER #OUTER #INNER #OUTER #INNER **0 -18411 4.0 **0 *.0 # 0 #.0 * * 0 46.1 415.1 415.1 -86.1 -86.1 -461.1 -461.1 1145.1 1145.1 -118.1 -118.1 -12711 MAN # 58.1 518.1 518.1 -107.1 -107.1 -575.1 -575.1 1430.1 1430.1 -148.1 -148.1 67.1 601.1 601.1 -124.1 -124.1 -667.1 1658.1 1658.1 -171.1 -171.1 0.# 990.# 990.#-1303.#-1303.# -98.1 -98.1 -525.1 -525.1 1304.1 1304.1 -135.1 -135.1 0.+ 1042.+ 1042.+-1372.+-1372.+ 0.4 1095.4 1095.4-1440.4-1440.4 0.¢ 1147.¢ 1147.¢-1509.¢-1509.¢ 0.4 1199.4 1199.4-1577.4-1577.4 0.# 1251.# 1251.#-1646.#-1646.# 0.4 1303.4 1303.4-1715.4-1715.4 0.* 1355.* 1355.4-1783.4-1783.4 0.# 1407.# 1407.#-1852.#-1852.# 0.# 1459.# 1459.#-1920.#-1920.# 0.4 1512.4 1512.4-1989.4-1989.4 0.# 1564.# 1564.#-2057.#-2057.# # RPH A RPM # RPM # RPH WAPE & RPH & RPH & RPH & RPM & RPH & RPH & RPH & RPH **0 **0 **0 **0 **0 # .0 # 0 **0 0.4 #.0 4.0 #*0 7517.¢ 7517.¢ -8590¢ -8590¢ 2733.¢ 2733.¢-3597.¢-3597.¢ 7912.4 7912.4 -90424 -90424 2877.4 2877.4-3786.4-3786.4 8308.¢ 8308.¢ -9494¢ -9494¢ 3021.¢ 3021.¢-3975.¢-3975.¢ 8704.# 8704.# -9946# -9946# 3165.# 3165.#-4164.#-4164.# 9890.# 9890.#-11303#-11303# 3597.# 3597.#-4732.#-4732.# 10.5# 510.# 510.# 10682.#10682.#-12207#-12207# 3884.# 3884.#-5111.#-5111.# 11077.#11077.#-12659#-12659# 4028.# 4028.#-5300.#-5300.# 9099.# 9099.#-10399#-10399# 3309.# 3309.#-4354.#-4354.# 11473.411473.4-131114-131114 4172.4 4172.4-5489.4-5489.4 65.0# 567.# 567.# 11868.#11868.#-13563#-13563# 4316.# 4316.#-5679.#-5679.# 9495.# 9495.#-10851#-10851# 3453.# 3453.#-4543.#-4543.# 10286.#10286.#-11755#-11755# 3740.# 3740.#-4922.#-4922.# -93.1 44.1 398.1 398.1 53.1 472.1 472.1 452.1 71.4 633.1 50-1 452-1 61.1 71.1 55.1 1.19 58.1 53.1 1.44 67.1 61.1 50.1 48. 46.1 -49.1 -49.1 43.1 -76.1 -76.1 -58.1 -58.1 -81.1 -73.1 -73.1 1.69-1-99- |-99--63.1 -63.1 1-09--55.1 -55.1 -53.1 -53.1 -51.1 -81.1 -60-1 -69--51.1 RPH RPH & RPM & RPM & 359.4 359.4 1 4824.1 48241 30.0¢ 378.¢ 378.¢ 415.4 415.4 3945.1 39451 453.4 453.8 37.5¢ 472.¢ 472.¢ 491.4 491.4 529.4 529.4 548.4 548.4 1 4577. | 45761 397.# 397.# 4352.1 4351 434.4 1 3766-1 37661 1 3444.1 34441 1 4139-1 41391 1 3598-1 35971 1 2914.1 29141 1 3161.1 31601 1 3033-1 30331 1 3298-1 32981 45.04 28.54 31.50

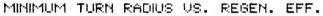
B.3 Regeneration In Steering

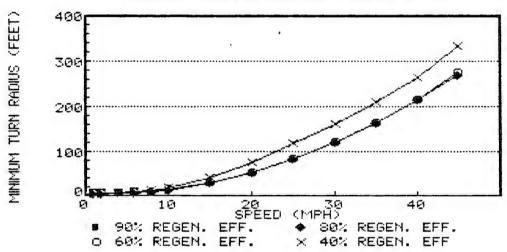
The effects of regeneration efficiency on steering performance were studied to quantify significance on this factor. The following curves illustrate the results of this study. The 19.5 ton vehicle parameters were used. The propulsive efficiency of the drive was based on the homopolar system, which is only slightly lower than the induction motor systems. Regeneration efficiency was varied as noted to determine the effects.

- 1. Figure B.3-1: These curves show that regeneration efficiencies of 60% or better will provide the same minimum turn radius.
- 2. Figure B.3-2: These curves show that regeneration efficiencies of 60% or better will provide the 0.5 G. lateral acceleration that is desirable for evasive maneuvers.
- 3. Figure B.3-3: These curves show that power requirements in turns decreases with improved regeneration efficiency, which will reduce fuel consumption.
- 4. Figure B.3-4: These curves show that improved regeneration efficiency increases outer sprocket maximum loads, potentially increasing the required size of motors and related gearing.
- 5. Figure B.3-5: These curves show that regeneration horsepower is constant with regeneration efficiencies of 60% or greater.
- 6. Figure B.3-6: These curves show regeneration efficiency indirectly changes scrub horsepower due to more scrubbing in the sharper turn.
- 7. Figure B.3-7: These curves show the effect of sharper turns on regenerated horsepower at 90% regeneration efficiency and that the resulting higher powers impose greater loads on system components.

The conclusion from the data provided by these curves was that regeneration efficiencies of 60% or better would provide satisfactory performance. Since all recommended drives provided the desired level of regeneration efficiency, this characteristic did not become a factor for discriminating between the various drives.

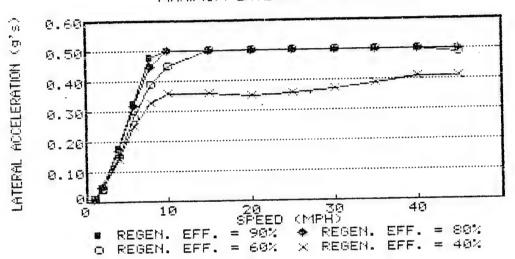
| X Data | 90% REGEN. EFF. | 80% REGEN. EFF. | 60% REGEN. EFF. | 40% REGEN |
|--------|-----------------|-----------------|-----------------|-----------|
| 1 | 5.28 | 5.48 | 5.88 | 6.29 |
| 2 | 5.31 | 5.50 | 6.06 | 6.62 |
| 4 | 6.06 | 6.38 | 7.02 | 7.86 |
| 6 | 7.20 | 7.61 | 8.58 | 9.81 |
| 8 | 8.84 | 9.46 | 10.97 | 12.98 |
| 10 | 13.40 | 13.40 | 14.88 | 18.59 |
| 15 | 30.15 | 30.15 | 30.15 | 41.54 |
| 20 | 53.60 | 53.60 | 53.60 | 76.43 |
| 25 | 83.75 | 83.75 | 83.75 | 117.64 |
| 30 | 120.60 | 120.60 | 120.60 | 161.86 |
| 35 | 164.15 | 164.15 | 164.15 | 209.92 |
| 40 | 214.40 | 214.40 | 214.40 | 263.90 |
| 45 | 271.35 | 271.35 | 276.64 | 332.37 |





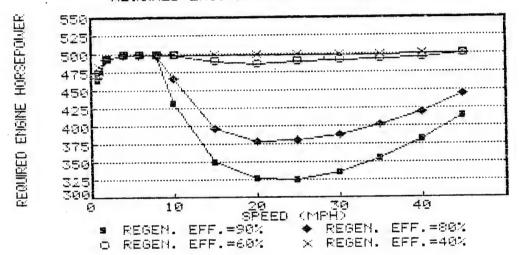
| X Data | REGEN. EFF. = " | 90% REGEN. EFF. | = 80% REGEN. EFF. | = 60% REGEN. EF |
|-------------------------------|---|--|--|--|
| X Data 1 2 4 6 8 10 15 20 25 | REGEN. EFF. = 9 0.01 0.05 0.18 0.33 0.48 0.50 0.50 0.50 | 0.01 0.05 0.17 0.32 0.45 0.50 0.50 0.50 | = 80% REGEN. EFF. 0.01 0.04 0.15 0.28 0.39 0.45 0.50 0.50 | 0.01 0.04 0.14 0.25 0.33 0.36 0.35 0.36 |
| 30 35 40 45 | 0.50 0.50 0.50 0.50 | 0.50 0.50 0.50 0.50 | 0.50 0.50 0.50 0.49 | 0.37 0.39 0.41 0.41 |

MAXIMUM LATERAL ACCELERATION

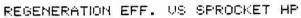


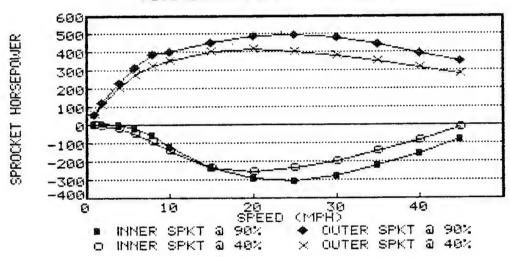
| X Data | REGEN. EFF. =907 | REGEN. EFF.=80% | REGEN. EFF.=60% | REGEN. EFF.=40% |
|--------|------------------|-----------------|-----------------|-----------------|
| 1 | 466 | 468 | 474 | 483 |
| 2 | 493 | 493 | 494 | 494 |
| 4 | 499 | 499 | 499 | 499 |
| 6 | 499 | 499 | 499 | 499 |
| 8 | 499 | 479 | 499 | 499 |
| 10 | 433 | 457 | 499 | 499 |
| 15 | 351 | 397 | 490 | 499 |
| 20 | 327 | 380 | 486 | 499 |
| 25 | 326 | 381 | 490 | 499 |
| 30 | 337 | 388 | 492 | 499 |
| 35 | 356 | 402 | 493 | 499 |
| 40 | 383 | 420 | 496 | 500 |
| 45 | 416 | 446 | 500 | 500 |

REQUIRED ENG. HP AT MAX. STEER CONDITION

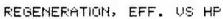


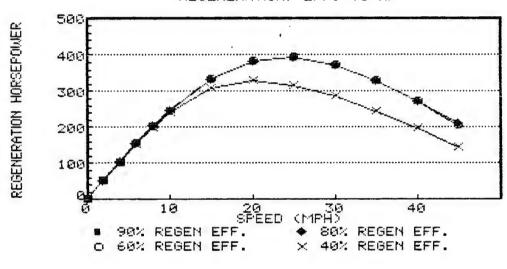
| X Data | INNER SPKT @ 90% | OUTER SPKT @ 90% | INNER SPKT @ 40% | OUTER SPK |
|--------|------------------|------------------|------------------|-----------|
| 1 | 4.73 | 63.27 | 0.21 | 57.42 |
| 2 | 9.15 | 126.15 | -1.94 | 111.72 |
| 4 | 4.43 | 234.40 | -17.86 | 204.68 |
| 6 | -16.57 | 320.93 | -48.30 | 276.71 |
| 8 | -51.80 | 387.11 | -91.06 | 327.51 |
| 10 | -116.86 | 404.26 | -140.81 | 357.07 |
| 15 | -232.50 | 452.45 | -229.44 | 403.59 |
| 20 | -290.43 | 488.21 | -254 | 416 |
| 25 | -301.40 | 497.20 | -235.33 | 405.57 |
| 30 | -274.45 | 480.19 | -194.63 | 383.54 |
| 35 | -220.37 | 444.44 | -140.86 | 354.32 |
| 40 | -150.54 | 399.49 | -78.98 | 321.35 |
| 45 | -75.10 | 354.42 | -7.91 | 282.79 |



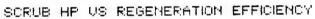


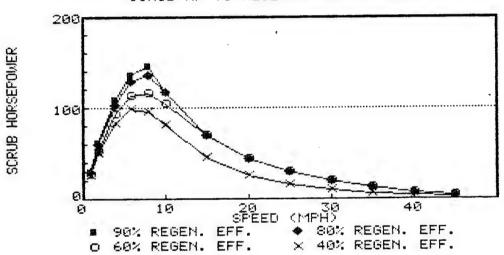
| X Data | 90% REGEN EFF. | 80% REGEN EFF. | 60% REGEN EFF. | 40% REGEN EFF |
|--------|----------------|----------------|----------------|---------------|
| 0 | 0 | 0 | 0 | 0 |
| 2 | 52 | 52 | 52 | 52 |
| 4 | 104 | 104 | 103 | 103 |
| 6 | 155 | 155 | 154 | 152 |
| 8 | 204 | 204 | 202 | 199 |
| 10 | 248 | 248 | 246 | 240 |
| 15 | 334 | 334 | 334 | 310 |
| 20 | 383 | 383 | 383 | 331 |
| 25 | 394 | 394 | 394 | 317 |
| 30 | 373 | 373 | 373 | 286 |
| 35 | 329 | 329 | 329 | 245 |
| 40 | 272 | 272 | 272 | 197 |
| 45 | 212 | 212 | 205 | 143 |





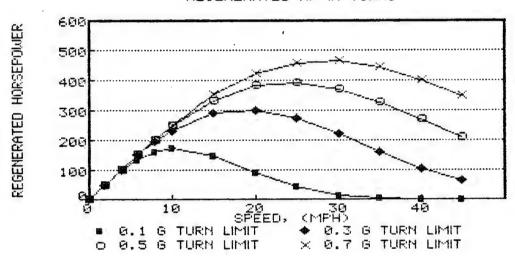
| X Data | 90% REGEN. EFF. | 80% REGEN. EFF. | 60% REGEN. EFF. | 40% REGEN. E |
|--------|-----------------|-----------------|-----------------|--------------|
| 1 | 31 | 30 | 28 | 26 |
| 2 | 62 | 60 | 54 | 50 |
| 4 | 109 | 103 | 93 | 83 |
| 6 | 137 | 129 | 114 | 99 |
| 8 | 147 | 137 | 117 | 97 |
| 10 | 118 | 118 | 105 | 82 |
| 15 | 70 | 70 | 70 | 47 |
| 20 | 45 | 45 | 45 | 27 |
| 25 | 30 | 30 | 30 | 17 |
| 30 | 20 | 20 | 20 | 11 |
| 35 | 13 | 13 | 13 | 7 |
| 40 | 8 | 8 | 8 | 5 |
| 45 | 5 | 5 | 5 | 3 |





| X Data | 0.1 G TURN LIMIT | 0.3 G TURN LIMIT | 0.5 G TURN LIMIT | 0.7 G TL |
|--------|------------------|------------------|------------------|----------|
| 0 | 0 | 0 | 0 | 0 |
| 2 | 52 | 52 | 52 | 52 |
| 4 | 101 | 104 | 104 | 104 |
| 6 | 139 | 154 | 155 | 155 |
| 8 | 164 | 197 | 204 | 204 |
| 10 | 175 | 234 | 248 | 252 |
| 15 | 152 | 293 | 334 | 353 |
| 20 | 95 | 304 | 383 | 423 |
| 25 | 44 | 275 | 394 | 460 |
| 30 | 16 | 222 | 373 | 466 |
| 35 | 5 | 162 | 329 | 445 |
| 40 | 1 | 108 | 272 | 403 |
| 45 | 0 | 66 | 212 | 349 |

REGENERATED HP IN TURNS



B.4 Impact Of Grades On Motor Loads While Steering

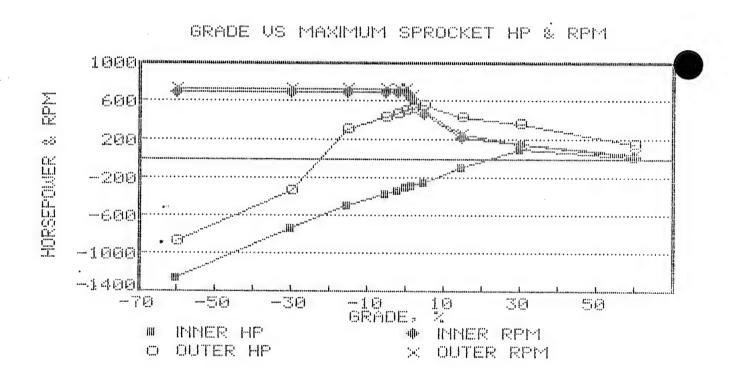
Data for turns on grades was evaluated and found to produce high momentary loads that are within the thermal limits of the drive components. Two curve sets were produced to investigate alternate operational assumptions.

The first set (Figure B.4-1) are titled "Grade vs. Maximum Sprocket HP & RPM". These curves plot the speeds and loads for the highest horsepowers and RPM that are theoretically possible. The power inputs from the ground (indicated as horsepower) become very high under certain conditions. The implied operation that produced these results cover some areas that are unrealistic combinations of speed, grade and turn radius. It is considered unlikely that a driver will make the sharpest possible turn, at maximum speed on the steepest downgrade.

The second set of curves (Figure B.4-2) titled "Grade vs. Maximum Sprocket HP & RPM (LTD)" represent a more limited operational envelope. Downhill speeds are limited to the speeds that the vehicle can achieve on upgrades. These curves are considered representative of a prudent driver under normal operating conditions.

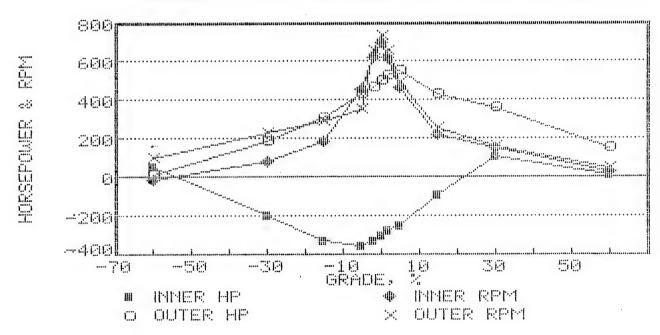
All points on the "LTD" curve are easily within the momentary overload capacity of the drives, which is considered reasonable for turning requirements. Downgrades steeper than 40% impose excessive loads at maximum 45 MPH speed, but operation at this combination of grade and speed is considered unrealistic. It was therefore concluded that normal turns on grades could present no peculiar load problems for the recommended electric drive systems.

| X Data | INNER HP | INNER RPM | OUTER HP | OUTER RPM |
|-----------|----------|-----------------|----------|-----------|
| 60 -30 | -1250.89 | 699 . 67 | -877.63 | 733.17 |
| -15 | -731 | 699.67 | -333.68 | 733.17 |
| | -493.71 | 699.67 | 315.70 | 733.17 |
| <u> </u> | -361.42 | 699.67 | 430.15 | 733.17 |
| | -325.45 | 699.67 | 469.25 | 733.17 |
| 0 | -301.42 | 699.67 | 497.22 | 733.17 |
| 2 | -277.40 | 617.97 | 525.18 | 655.66 |
| 5 | -244.67 | 462.01 | 556.30 | 493.21 |
| 15 | -93 | 223.28 | 430.98 | 254.34 |
| 30 40 | 111.69 | 154.84 | 361.74 | 163.57 |
| au | 16.49 | 32.89 | 148.84 | 46.71 |



| X Data | INNER HP | INNER RPM | OUTER HP | OUTER RFM |
|----------|----------|-----------|----------|------------------|
| -60 | 54.12 | -17.08 | 13 | 96.68 |
| -30 | 195.50 | 83.83 | 184.11 | 234.58 |
| -15 | -323.88 | 188.55 | 312.41 | 289.06 |
| | -348.27 | 452.49 | 430.15 | 356.10 |
| -5 -2 | -325.45 | 617.97 | 469.25 | 455.46 733.17 |
| O | -301.42 | 699.67 | 497.22 | 655.66 |
| 2 | -277.40 | 617.97 | 525.18 | |
| 5 | -244.67 | 462.01 | 554.30 | 493.21 |
| 15 | -93 | 223.28 | 430.98 | 254.34 |
| 30 | 111.69 | 154.84 | 361.74 | 163.57 |
| 40 | 16.49 | 32.89 | 148.84 | 46.71 |

GRADE US MAX SPROCKET HP & RPM (LTD.)



CODE: #2TRTRN

SFROCKET HORSEFOWER BY:W.E. RODLER L.M. FERNANDEZ

KEV.DATE: 91984 KUN DATE:52985.11

| | ****** TORQUE (1bft) | 687.73 | 706.35 | 768.70 | 537,98 | 225,35 | -604.87 | -1624.99 | -2726.82 | -3809.30 | -4792.63 | -5625,78 | -6286.98 | **** |
|---|--|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|--|
| GRADE,%=-60 COEFFICIENT OF FRICTION= MAXIMUM ACCELERATION ,gs= DRIVE EFF. @SR>.2= 82 REGENERATION EFF.= 90 | ************************************** | 37.11 6 | 96.68 | 230.36 7 | 219.91 | 234.58 | 289.06 -6 | 356.10 -16 | 428.16 -27 | 502.74 -38 | 578.75 -47 | 655,66 -54 | 733.17 -62 | **** |
| | ************************************** | 4.86 | 13.00 | 33.72 | 22.53 | 10.07 | -33,29 | -110,18 | -222.30 | -364.63 | -528.12 | -702.31 | -877,63 | ************************************** |
| EETH= 11 o per ton= 100 | ************************************** | -16624.15 | -16642.10 | -16702.05 | -16467.32 | -16149.08 | -15302.82 | -14260,28 | -13129,57 | -12011.83 | -10986.82 | -10105.57 | -9389.87 | **** |
| TREAD WIDTH,in= 92.5 TRACK LENGTH,in= 150 TRACK PITCH,in= 6.03 NUMBER OF SPROCKET TEETH= ROLLING RESISTANCE,1b per | ************************************** | -5.27 -1 | -17.08 -1 | -71.16 -1 | 18.90 -1 | 83.83 -1 | 168.55 -1 | 280.72 -1 | 367.86 -1 | 452.49 -1 | 535.68 -1 | 617.97 -1 | - 69.69 | *** |
| | ************************************** | 16.68 | . 54.12 | 226.28 | -59.25 | -257.74 | -549.38 | -762.19 | -919.60 | -1034.86 | -1120.58 | -1189.04 | -1250.89 | *** |
| T,tons= 19.5 oh= 45 o | ******** TURN FADIUS (ft) | 4.77 | 4.44 | ю м | 7.54 | 13.40 | 30.15 | 53.60 | 83.75 | 120.60 | 164.15 | 214.40 | 271.35 | **** |
| GROSS VEHICLE WEIGHT, tonse GROSS VEHICLE WEIGHT, tonse MAXIMUM VELOCITY , mph= 45 ENGINE GROSS HP= 500 LOSS ENGINE HF= 60 FRONTAL AREA , in= 57 COEFFICIENT OF DRAG= 1 | ************************************** | 0.01 | 60.0 | 0.50 | 0.50 | 0.80 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | ********** |
| DATA GROSS VE MAXIMUM ENGINE LOSS ENG FRONTAL COEFFICI | ************************************** | 1.00 | 2.50 | 00.00 | 7.50 | 10.00 | 15.00 | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 | 45.00 | **** |
| | * * * * * | | | | | B-1 | 102 | | | | | | | **** |

SPROCKET HORSEPOWER

| REV.DATE: 91984 RUN DATE:52985.10 | ************************************** | |
|--------------------------------------|--|--|
| BY:W.E. RODLER L.M. FERNANDEZ | ************************************** | |
| CODE:#2TRTRN | ************************************** | |

| ******* TORQUE (1bft) | 4581.70 | 4586.63 | 4598.55 | 4434.63 | 4122.00 | 3291.78 | 2271.66 | 1169.82 | 87.35 | -895.98 | -1729.13 | -2390.33 |
|--|-----------|-----------|-----------|-----------|--------------|-----------|-----------|----------|----------|----------|----------|----------|
| ************************************** | | | | | | | | | 74 | | | |
| ************************************** | 36.90 | 93.16 | 190.83 | 219.91 | 234.58 | 289.06 | 356.10 | 428.16 | 502.74 | 578.75 | 655.56 | 733.17 |
| .************************************* | 32.19 | 81.36 | 167.09 | 185.68 | 184.11 | 181.17 | 154.02 | 95.37 | 95.8 | -98.73 | -215.86 | -333.68 |
| :************************************* | -12724.82 | -12729.08 | -12738.60 | -12570.67 | -12252.43 | -11406.18 | -10363.61 | -9232.92 | -8115.18 | -7090.17 | -6208.92 | -5493.22 |
| ************************************** | -5.06 | -13.56 | -31.63 | 18.90 | 80.88 | 188.55 | 280.72 | 367.86 | 452.49 | 535.68 | 617.97 | 699.67 |
| ************************************** | 12.26 | 32.86 | 76.72 | -45,23 | -195.55 | -409.49 | -553.92 | -646.68 | -699.15 | -723.15 | ~730.55 | -731.79 |
| ******** TURN RADIUS (ft) | 4.81 | 4.73 | 4.54 | 7.54 | 13.40 | 30.15 | 53.60 | 83.75 | 120.60 | 164.15 | 214.40 | 271.35 |
| ************************************** | 0.01 | 60.0 | 0.37 | 0.50 | 0.50 | 0.50 | 0.50 | 05.0 | 0.50 | 0.50 | 0.50 | 0.50 |
| ********* F.E.S.U. VEHICLE SPEED (mph) | 1.00 | 2.50 | J. 00 | 7.50 | 10.00 | 15.00 | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 | 45.00 |
| * * * * * * | | | | | B - 1 | 03 | | | | | | |

SFR.

SPROCKET HORSEPOWER

TRACK PITCH,in= 6.03 MAXIMUM ACCELERATION ,gs= .5 NUMBER OF SPROCKET TEETH= 11 DRIVE EFF. @SR>.2= 82 ROLLING RESISTANCE,1b per ton= 100 REGENERATION EFF.= 90 . 7 COEFFICIENT OF FRICTION= RUN DATE: 52985.09 REV. DATE: 91984 TRACK LENGTH, in= 150 TREAD WIDTH,in= 92.5 BY:W.E. RODLER L.M. FERNANDEZ GROSS VEHICLE WEIGHT, tons= 19.5 MAXIMUM VELOCITY ,mph= 45 ENGINE GROSS HP= 500 FRONTAL AREA ,in= 57 COEFFICIENT OF DRAG= 1 DATA INFUT: LOSS ENGINE HP= 60 CODE: #2TRIRN

| RESULTS: | RESULTS: | | | | | | | |
|-----------------------------|--|------------------------|--------------------------|---|----------------------------|---------------------------|---|------------------|
| VEHICLE SPEED ((mph) | EHICLE LATERAL SPEED ACCELERATION (mph) (gs) | TURN RADIUS (ft) | IN HORSEPOWER (hp) | INNER SPROCKET R ROT. SPEED (rpm) | KET ED TORQUE (16ft) | OU) HORSEPOWER (hp) | OUTER SPROCKET R ROT. SPEED (rpm) | TORQUE (1bft) |
| 1.00 | 0.01 | 4.84 | 9.71 | -4.93 | -10338.55 | 48.76 | 36.77 | 6964.69 |
| 2.50 | 0.09 | 4.91 | 22.85 | -11.61 | -10334.45 | 120.90 | 91.21 | 6961.25 |
| 5.00 | 0.31 | 5. va | 27.95 | -14.24 | -10307.07 | 229.06 | 173.44 | 8936.28 |
| 7.50 | 0.50 | 7,54 | -36.65 | 18.90 | -10186.04 | 285.53 | 219.91 | 6819.26 |
| 10.00 | 0.50 | 13.40 | -157.49 | 83.83 | -9867.80 | 290.62 | 234.58 | 6506.62 |
| 15.00 | 0.50 | 30.15 | -323,88 | 188.55 | -9021.55 | 312.41 | 289.06 | 5676.41 |
| 20.00 | 0.50 | 53.60 | -426.47 | 280.72 | -7978.98 | 315.70 | 356.10 | 4656.28 |
| 25.00 | 0.50 | 83.75 | -479.66 | 367.86 | -6848.29 | 289.77 | 428.16 | 3554,45 |
| 30.00 | 0.50 | 120.60 | -493.71 | 452.49 | -5730,56 | 236.62 | 502.74 | 2471.98 |
| 35.00 | 0.50 | 164.15 | -479.93 | 535.68 | -4705.54 | 164.04 | 578,75 | 1488.65 |
| 40.00 | 0.50 | 214.40 | -449.97 | 617.97 | -3824.30 | 81.83 | 655.65 | 655.49 |
| 45.00 | 0.50 | 271.35 | -414.12 | 699.67 | -3108.60 | -0.80 | 733.17 | -5.70 |

CODE: #2TRIRN

HORSEFOWER BY:W.E. RODLER SPROCKET

L.M. FERNANDEZ

RUN DATE: 52985.08 REV. DATE: 91984

(1bft) 3176.72 4160.05 2343.56 7364.48 6344,35 5242,52 TORQUE 8664.22 8654.59 8605.73 8507.33 8194.69 1682.37 MAXIMUM ACCELERATION ,95= .5 DRIVE EFF. @SR>.2= 82 COEFFICIENT OF FRICTION= OUTER SPROCKET ROT. SPEED ROLLING RESISTANCE,1b per ton= 100 REGENERATION EFF.= 90 428.16 502,74 578.75 655.66 733.17 92.22 234.58 285.06 356.10 37,70 167.94 219,91 (rpm) GRADE, %=-5 HORSEPOWER 62.19 234,85 275.18 430,15 427.38 350.06 292.57 (hp) 356.21 366.01 405.32 398.21 151.97 (lbft) -4042.49 -3017.48 -1420.53 -7333.48 -5160.23 -2136.23 TRACK FITCH, in= 6.03 NUMBER OF SPROCKET TEETH= 11 TORQUE -8661.95 -8651,65 -8600.39 -8497.97 -8179.73 -6290.91 INNER SPROCKET ROT. SPEED TRACK LENGTH, in= 150 TREAD WIDTH, in= 92.5 188.55 452.49 535.68 (rpm) -5,85 -12.62 -8.74 18.90 82.83 280.72 367.86 617.97 79.869 HORSEPOWER 9.66 -361.42 -307.76 -251.35 (hp) 263,28 -336.24 -189.24 20.79 -30.58 -130.55 -348.27 14.31 GROSS VEHICLE WEIGHT, tons= 19.5 RADIUS 7.54 164.15 4.82 5,72 83,75 20.60 214.40 271.35 TURN 4.54 13.40 30.15 53.60 (ft) MAXIMUM VELOCITY ,mph= 45 COEFFICIENT OF DRAG= DAHA INFUH: ENGINE GROSS HP= 500 FRONTAL AREA ,in= 57 SPEED ACCELERATION LOSS ENGINE HP= 40 LATERAL 0.50 0.50 0.50 0.20 े. ध 0.50 0.50 0.50 0.50 0.01 0.09 0.29 RESULTS: (35) VEHICLE (mph) 40.00 45.00 00.01 5.00 7.50 1.00 2.50 5.00 20.00 25.00 30.00 35.00

HORSEPOWER SPROCKET

REV. DATE: 91984

TRACK PITCH, in= 6.03 MAXIMUM ACCELERATION ,gs= .5 NUMBER OF SPROCKET TEETH= 11 DRIVE EFF. @SR>.2= 82 ROLLING RESISTANCE,1b per ton= 100 REGENERATION EFF.= 90 COEFFICIENT OF FRICTION= RUN DATE: 52985.07 GRADE, %=-2 TRACK LENGTH, in= 150 TREAD WIDTH,in= 92.5 BY:W.E. RODLER L.M. FERNANDEZ GROSS VEHICLE WEIGHT, tons= 19.5 MAXIMUM VELOCITY ,mph= 45 ENGINE GROSS HP= 500 FRONTAL AREA ,in= 57 COEFFICIENT OF DRAG= 1 DATA INFUT: LOSS ENGINE HF= 40 CODE: #2TRIEN

HORSEFOWER SPROCKET

L.M. FERNANDEZ BY:W.E. RODLER

REV. DATE: 91984 RUN DATE:52985.06

TRACK PITCH,in= 6.03 MAXIMUM ACCELERATION ,gs= .5 NUMBER OF SFROCKET TEETH= 11 DRIVE EFF. @SR>.2= 82 ROLLING RESISTANCE,1b per ton= 100 REGENERATION EFF.= 90 COEFFICIENT OF FRICTION= GRADE, %= 0 TRACK LENGTH, in= 150 TREAD WIDTH, in= 92.5 TRACK PITCH, in= 6.03 GROSS VEHICLE WEIGHT, tons= 19.5 MAXIMUM VELOCITY ,mph= 45 ENGINE GROSS HP= 500 LOSS ENGINE HP= 40 FRONTAL AREA ,in= 57 COEFFICIENT OF DRAG= 1 "HULLUI CODE: #2TRIEN DATA

| M | 9.56 | 0.81 444.45 | 5.82 480.21 | 3.56 497.22 | 4.25 488.24 | 5.82 452.46 | 3.07 404.27 | 3.74 381.86 | 3.93 287.99 | 5.54 159.62 | 4.08 65.20 | OI TORQUE HORSEPOWER (1bft) (hp) |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|--|
| 699.67 -563.86 | 617.97 -1279.56 | 535.68 -2160.81 | 452.49 -3185.82 | 367.86 -4303.56 | 280.72 -5434.25 | 188.55 -6476.82 | 83.83 -7323.07 | 24.11 -7618.74 | -1.15 -7713.93 | -8.74 -7773.54 | -4.21 -7784.08 | NNER SPROCKET ROT. SPEED T (rpm) |
| -75.12 | -150.56 | -220.39 | -274.47 | -301.42 | -290.45 | -232.52 | -116.88 | -34.97 | 1.69 | 12.94 | 6.23 | HORSEPOWEI (hp) |
| 0 271.35 | 0 214.40 | 164.15 | 0 120.60 | 93.75 | 0 23.60 | 30.15 | 13.40 | 7.95 | 7 6.25 | 3 5.20 | 5.02 | AL TURN ATION RADIUS (+t) |
| 45.00 0.50 | .00 0.50 | .00 0.50 | .00 0.50 | 00.50 | .00 0.50 | 00.50 | .00. | 50 0.47 | .00 0.27 | 50 0.08 | 00.01 | MESTICLE LATERAL SPEED ACCELERATION (mph) (gs) |
| | 40.00 | 35.00 | 30.00 | 25.00 | 00.02 8-10 | 15.00 | 10.00 | 7.50 | 5.00 | 2.50 | 1.00 | SPEED ACC (mph) |

CODE: #2TRTRN

SPROCKET HORSEPOWER

REV. DATE: 91984 RUN DATE:52985.04

TRACK PITCH,in= 6.03 MAXIMUM ACCELERATION ,gs= .5 NUMBER OF SPROCKET TEETH= 11 DRIVE EFF. @SR>.2= 82 ROLLING RESISTANCE,1b per ton= 100 REGENERATION EFF.= 90 COEFFICIENT OF FRICTION= .7 GRADE, %= 2 TREAD WIDTH, in= 92.5 TRACK LENGTH, in= 150 BY:W.E. RODLER L.M. FERNANDEZ GROSS VEHICLE WEIGHT, tons= 19.5 MAXIMUM VELOCITY ;mph= 45 ENGINE GROSS HP= 500 FRONTAL AREA ,in= 57 COEFFICIENT OF DRAG= 1 DATA INFUT: LOSS ENGINE HP= 60

| ***** | TORQUE (1bft) | 9819.20 | 9809.54 | 9742.01 | 9637.65 | 9394,38 | 8564.16 | 7544.04 | 6442.21 | 5359,74 | 4376.41 | 3543.25 |
|--|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|
| ****** | OUTER SPROCKET R ROT. SPEED (rpm) | 34.48 | 84.72 | 153.18 | 205.41 | 234.58 | 289.06 | 356.10 | 428.16 | 502.74 | 578.75 | 655,66 |
| ************************************** | OU' HORSEPOWER (hp) | 64.47 | 158.24 | 284.13 | 376.93 | 419.60 | 471.34 | 511.49 | 525.18 | 513.04 | 482.25 | 442.33 |
| ******** | T TORQUE (1bft) | -7417.55 | -7407.22 | -7337.28 | -7228.92 | -6980.04 | -6133.79 | -5091.22 | -3960.54 | -2842.80 | -1817.79 | -936.54 |
| ***** | INNER SPROCKET R ROT. SPEED (rpm) | -2.64 | - G | 6.03 | 60°00 | 83.83 | 188.55 | 280.72 | 367.86 | 452,49 | 535.68 | 617.97 |
| ******* | IN HORSEFOWER (hp) | 3.73 | 7.22 | -8.42 | -45.96 | -111.40 | -220.21 | -272.12 | -277.40 | -244.92 | -185.40 | -110.19 |
| | TURN RADIUS (ft) | 5.44 | 5.62 | 98.9 | 8.81 | 13.40 | 30,15 | 53.60 | 83.75 | 120.60 | 164.15 | 214.40 |
| ************************************** | EHICLE LATERAL SPEED ACCELERATION (mph). (gs) | 0.01 | 0.07 | 0.24 | 0.43 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| ************************************** | VEHICLE LATERAL SPEED ACCELERAT (mph). (gs) | 1.00 | 2.50 | 00.00 | 7.50 | 10.00 | 15.00 | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 |
| **** | | | | | | В | -108 | 8 | | | | |

CODE: #2TRIRN

HORSEPOWER SFROCKET

BY:W.E. RODLER L.M. FERNANDEZ

REV. DATE: 91984 RUN DATE:52985.03

GRADE,%= 5 COEFFICIENT OF FRICTION= .7 MAXIMUM ACCELERATION ,gs= .5 DRIVE EFF. @SR>.2= 82 ROLLING RESISTANCE, 1b per ton= 100 REGENERATION EFF. = 90 NUMBER OF SPROCKET TEETH= 11 TRACK LENGTH,in= 150 TRACK PITCH,in= 6.03 TREAD WIDTH, in= 92.5 GROSS VEHICLE WEIGHT, tons= 19.5 MAXIMUM VELOCITY ,mph= 45 ENGINE GROSS HP= 500 FRONTAL AREA ,in= 57 COEFFICIENT OF DRAG= 1 DATA INFUT: LOSS ENGINE HP= 60

| ************************************* | OUTER SPROCKET ORQUE HORSEPOWER ROT. SPEED TORQUE (1bft) (hp) (rpm) (1bft) | 78 66.24 33.71 10319.70 | 85 160.96 82.05 10303.44 | 41 289.75 148.74 10231.41 | 76 382.50 198.69 10110.77 | 02 440.02 233.49 9897.64 | 15 499.61 289.06 9077.80 | .59 546.32 356.10 8057.68 | 84 556.30 426.98 6842.79 | .65 405.95 493.21 4322.86 |
|--|--|-------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|----------------------------------|--------------------------|---------------------------|
| ********* | INNER SPROCKET R ROT. SPEED TORQUE (rpm) (1bft | -1.87 -6890.78 | -2.45 -6873.85 | 10.47 -6799.41 | 40.12 -6674.76 | 84.92 -6456.02 | 188.55 -5620.15 | 280.72 -4577.59 | 369.04 -3333.84 | 462.01 -778.65 |
| ******** | INN HORSEFOWER (hp) | 2,45 | 3.20 | -13.55 | -50.98 | -104.38 | -201.77 | -244.67 | -234.25 | 05°89- |
| | TUKN RADIUS (ft) | 5.68 | 5,98 | 7.30 | . 55 55 | 13.60 | 30,15 | 53.60 | 87.16 | 194.25 |
| ************************************** | VEHICLE LATERAL SPEED ACCELERATION (mph) (gs) | 0.01 | 0.07 | 0.23 | 0.39 | 0.49 | 0.50 | 0.50 | 0.48 | 0.31 |
| * (') L | VEHICLE SPEED (mph) | 1.00 | 2.50 | u, 00 | 7.50 | 10.00 | 15.00 | ი. ი. ი. ი. ი. მ. | 52°00 | 30.00 |
| * * | | | | | | | 11.1. | 17.5 | | Į. |

| U) | 1 |
|-----|-------------------------|
| L | |
| 0 | Į |
| Ŧ | : |
| - | |
| | í |
| - | |
| Ш | |
| V | |
| ΰ | |
| | |
| 0 | |
| | |
| ě. | |
| Û | |
| (i) | |
| | |
| | |
| | |
| | |
| | - |
| | The same of the same of |
| | 1 |
| | ì |

SEFOWER

| REV. DATE: 91984 RUN DATE:52985.01 | ************************************** |
|---------------------------------------|--|
| BY:W.E. RODLER L.M. FERNANDEZ | #************************************* |
| CODE: #2TRTRN | ************************************** |

| MAXIMUM ENGINE G | MAXIMUM VELOCITY ,mph= 4 ENGINE GROSS HP= 500 | n= 45 | TRACK LEN | TRACK LENGTH,in= 150 TRACK FITCH.in= 6.03 | | MAXIMUM ACC | COEFFICIENT OF FRICTION= . MAXIMUM ACCELERATION .OS= | N= .7 |
|--|--|----------------|--|--|----------|-------------------|---|----------|
| LOSS ENG | INE HF= 60 | | NUMBER OF | NUMBER OF SPROCKET TEETH= 11 | EETH= 11 | DRIVE EFF. | DRIVE EFF. @SR>, 2= 82 | |
| FRONTAL COEFFICI | FRONTAL AREA ,in= 57 COEFFICIENT OF DRAG= | 1 | ROLLING R | ROLLING RESISTANCE, 16 per | ton= | 100 REGENERATION | REGENERATION EFF. = 90 | |
| ************************************** | ********* | ***** | ************************************** | ****** | ******* | ******** | ***** | ***** |
| VEHICLE SPEED A | VEHICLE LATERAL SPEED ACCELERATION | TURN RADIUS | IN HORSEFOWER | INNER SPROCKET HORSEPOWER ROT. SPEED |) I | OU. HORSEPOWER | OUTER SPROCKET R ROT. SPEED | 10 |
| (mph) | (36) | (ft) | (hp) | (rpm) | (1bft) | (hp) | (rpm) | (1bft) |
| 1.00 | 0.01 | 6.47 | 00.0- | 0,31 | -5158.84 | 71.83 | 31.53 | 11963.90 |
| 2.50 | 90.0 | 7.27 | -4.94 | 5.08 | -5114.34 | 169,14 | 74.52 | 11920.07 |
| 5.00 | 0.18 | 50.6 | -24.38 | 25.61 | -4999.53 | 300.33 | 133.59 | 11807.67 |
| 7.50 | 0.28 | 13.37 | -57.12 | 62.72 | -4782,95 | 388,74 | 176.08 | 11595.10 |
| . 00.01 | 0.29 | 22.75 | 86.26- | 114.80 | -4299,46 | 430.98 | 203,61 | 11117.22 |
| 15.00 | 0.15 | 97.57 | -57.01 | 223,28 | -1341.11 | 395,87 | 254.34 | 8174.90 |

| L | Ū |
|-----------|--------|
| RSEF | TO CO |
| (j) | Ü |
| Ľ | |
| | L |
| I | DV. Lt |
| - | |
| Ш | |
| T III Y I | |
| | |
| | |
| ľ | |
| il (i) | |
| (I) | |
| | |
| | |

| REV. DATE: 91984 RUN DATE:52985.02 | ************************************** |
|---|--|
| SPROCKET HORSEPOWER BY:W.E. RODLER L.M. FERNANDEZ | ************************************** |
| SPROCKE | ************************************** |
| CODE:#2TRTRN | ************************************** |

| **** | ******** | ******** | ****** | ******* | ***** | ****** | ************************************** | ******* | ***** |
|------|-----------------|-------------------------------|----------------|--------------------|----------------------------|------------------|--|---------------------|------------------|
| ٠. | NEWICLE LATERAL | -75. LATERAL | TURN | ZI | INNER SPROCKET | _ | -uo | OUTER SPROCKET | _ |
| | SPEED A(| SPEED ACCELERATION (mph) (gs) | RADIUS (ft) | HORSEPOWER (hp) | HORSEPOWER ROT. SPEED (hp) | TORQUE (1bft) | HORSEFOWER ROT. SPEED (hp) (rpm) | ROT. SPEED (rpm) | TORQUE (16ft) |
| | 1.00 | 0.01 | 9.23 | -2.49 | 4.98 | -2623.10 | 72.61 | 26.86 | 14197.42 |
| | 2.50 | 0.04 | 10.34 | -7.51 | 15.38 | -2562,79 | 172.87 | 64.22 | 14137.78 |
| | 00.00 | 0.11 | 15.38 | -20.43 | 46.77 | -2294.58 | 296.97 | 112.44 | 13871.97 |
| | 7.50 | 0.12 | 30.10 | -28.00 | 54.24 | -1560.50 | 361.74 | 144.57 | 13141.90 |
| | 10.00 | 0.03 | 231.58 | 111.69 | 154.84 | 3788.48 | 242.87 | 163.57 | 7798.54 |

SPROCKET HORSEPOWER BY:W.E. KODLER

| REV.DATE: 91984 RUN DATE:52985.05 | *********** | | GRADE, %= 60 | COEFFICIENT OF FRICTION= .7 | MAXIMUM ACCELERATION ,95= .5 | DRIVE EFF. @SR>. 2= 82 | O REGENERATION EFF. = 90 | |
|--------------------------------------|--|-------------|----------------------------------|-----------------------------|------------------------------|------------------------------|--|------------------------|
| BY:W.E. RODLER L.M. FERNANDEZ | *********** | | TREAD WIDTH,in= 92.5 | TRACK LENGTH, in= 150 | TRACK PITCH,in= 6.03 | NUMBER OF SPROCKET TEETH= 11 | ROLLING RESISTANCE, 1b per ton= 100 REGENERATION EFF. = 90 | |
| CODE:#2TRTRN | ************************************** | DATA INFUT: | GROSS VEHICLE WEIGHT, tons= 19.5 | MAXIMUM VELOCITY , mph = 45 | ENGINE GROSS HP= 500 | LOSS ENGINE HP= 60 | FRONTAL AREA ,in= 57 | COEFFICIENT OF DRAG= 1 |

| | <u> </u> |) TORQUE | (lbft) | 17476.94 | 16735.96 |
|----------|-----------------|-----------------------|--------|----------|----------|
| | TER SPROCKE | ER ROT. SPEED TO | (rpm) | 20.72 | 46.71 |
| | 00 | 3 | (hp) | 68.94 | 148.84 |
| | | TORQUE | (lbft) | 1890.67 | 2632.33 |
| | NER SPROCKET | HORSEPOWER ROT. SPEED | (rpw) | 11.12 | 32.89 |
| | Z | HORSEFOWER | (hp) | 4.00 | 16.49 |
| | TURN | RADIUS | (ft) | 21.05 | 36.55 |
| LTS: | VEHICLE LATERAL | SPEED ACCELERATION | (s6) | 00.00 | 0.01 |
| RESULTS: | VEHICLE | SPEED | (Hqm) | 1.00 | 2.50 |

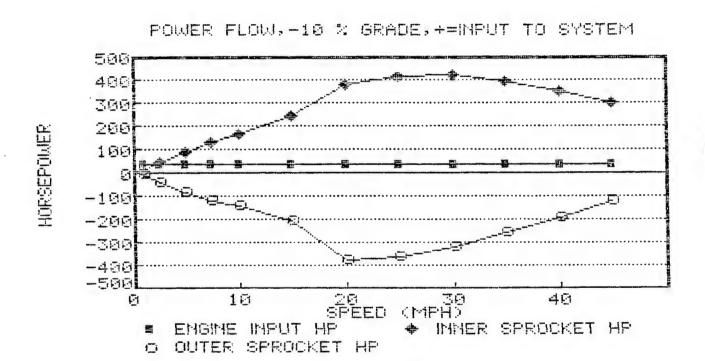
B.5 Downhill Steering Limit

Limited available power while coasting downhill can limit steering control. When operating on moderate downgrades, the engine can at times be operating near idle condition. Steering reactions can then be limited by power available. This condition is encountered with mechanically driven tracked vehicles and it is necessary for the drive to give the engine added throttle to obtain normal steering response. Since it is instinctive to turn and apply brakes to avoid an obstacle, special driver training is required to assure proper response. The results of the studies on this subject are shown on the following curves and their data sheets.

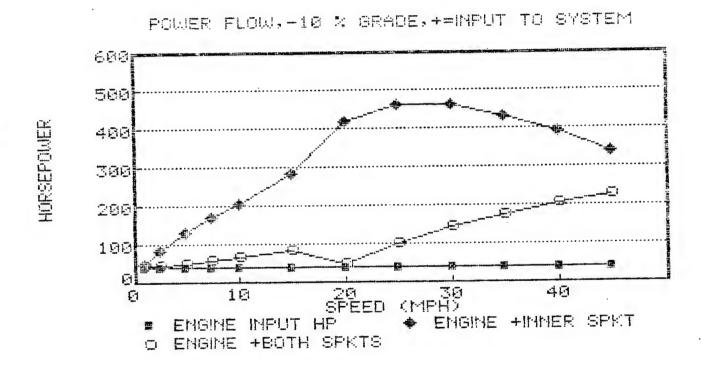
- 1. Figure B.5-1: These curves show a typical power distribution for maximum turn going down a moderate grade.
- 2. Figure B.5-2: These curves replot the same data as Figure B.5-1, but a summation curve "Engine + Both Sprockets" is shown. At points near 20 MPH the net power barely covers system losses.
- 3. Figure B.5-3: These curves show that below 20 MPH decreased net engine power degrades steering ability.
- 4. Figure B.5-4 and B.5-5: These curves plot the same data with different scales for better legibility. They show that steering ability is limited up to 25 MPH.

Acceleration analysis was made for the 60% grade starts and the results are shown in Figures 5.2.6.4-1. These curves show positive starts that promptly reach grade limited speed.

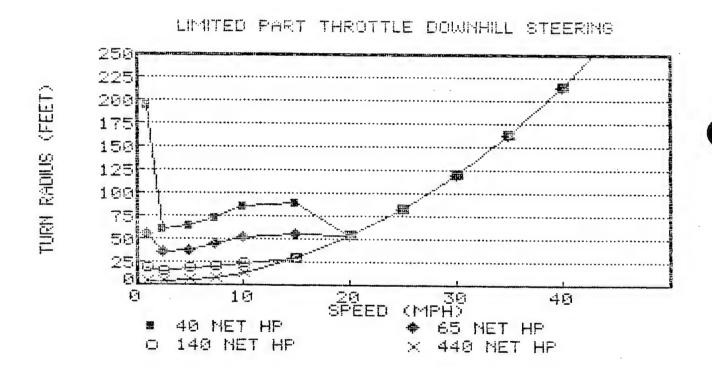
| X I |)ata | ENGINE | INPUT | HP | INNER | SFROCKET | HP | OUTER | SPROCKET | HP |
|-----|------|--------|-------|----|--------|----------|----|--------|----------|----|
| 1 | | 40 | | | 9.94 | | | -5.29 | | |
| 2.5 | 50 | 40 | | | 46.46 | | | -42.85 | 5 | |
| 5 | | 40 | | | 92 | | | -83.80 | Ò | |
| 7.5 | 50 | 40 | | | 132.80 | 3 | | -116.0 | 02 | |
| 10 | | 40 | | | 167.2 | 9 | | -138. | 97 | |
| 15 | | 40 | | | 245.5 | 5 | | -201.3 | 24 | |
| 20 | | 40 | | | 381.6 | 7 | | -372. | 48 | |
| 25 | | 40 | | | 420.93 | 5 | | -358. | 0.4 | |
| 30 | | 40 | | | 421.5 | 1 | | -316. | 79 | |
| 35 | | 40 | | | 394.4 | 7 | | -256. | 34 | |
| 40 | | 40 | | | 351.3 | 8 | | -185. | 40 | |
| 45 | | 40 | | | 302.5 | 0 | | -116. | 14 | |
| | | | | | | | | | | |



| X Data | ENGINE | INPUT | HP | ENGINE | + INNER | SPKI | ENGINE | TDUIN | 578.15 |
|--------|--------|-------|----|--------|---------|------|--------|-------|--------|
| i | 40 | | | 9.94 | | | -5.29 | | |
| 2.50 | 40 | | | 46.46 | | | -42.85 | | |
| 5 | 40 | | | 92 | | | -83.80 | | |
| 7.50 | 40 | | | 132.80 | | | -116.0 | 2 | |
| 10 | 40 | | | 167.29 | · | | -138.9 | 7 | |
| 15 | 40 | | | 245.55 | | | -201.2 | 4 | |
| 20 | 40 | | | 381.67 | | | -372.4 | 8 | |
| 25 | 40 | | | 420.95 | | | -358.0 | 4 | |
| 30 | 40 | | | 421.51 | | | -316.7 | 9 | |
| 35 | 40 | | | 394.47 | | | -255.3 | 4 | |
| 40 | 40 | | | 351.38 | | | -186.4 | 0 | |
| 45 | 40 | | | 302.50 | | | -116.1 | 4 | |
| | | | | | | | | | |

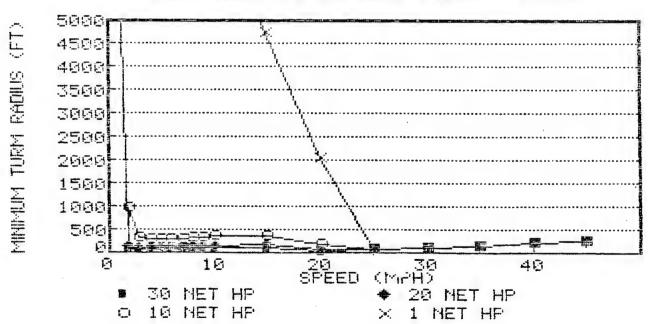


| X Data | 40 NET HP | 65 NET HP | 140 NET HP | 440 NET HP |
|--------|-----------|-----------|------------|------------|
| 1 | 194.88 | 56.54 | 18.07 | 4.85 |
| 2.50 | 62.12 | 36.16 | 16.04 | 4.97 |
| 5 | 64.65 | 39.02 | 17.97 | 5.48 |
| 7.50 | 73.82 | 45.09 | 20.80 | 7.54 |
| 10 | 86.38 | 52.89 | 24.45 | 13.40 |
| 15 | 90.75 | 55.72 | 30.15 | 30.15 |
| 20 | 53.60 | 53.60 | 53.60 | 53.60 |
| 25 | 83.75 | 83.75 | 83.75 | 83.75 |
| 30 | 120.60 | 120.60 | 120.60 | 120.60 |
| 35 | 164.15 | 164.15 | 164.15 | 164.15 |
| 40 | 214.40 | 214.40 | 214.40 | 214.40 |
| 45 | 271.35 | 271.35 | 271.35 | 271.35 |



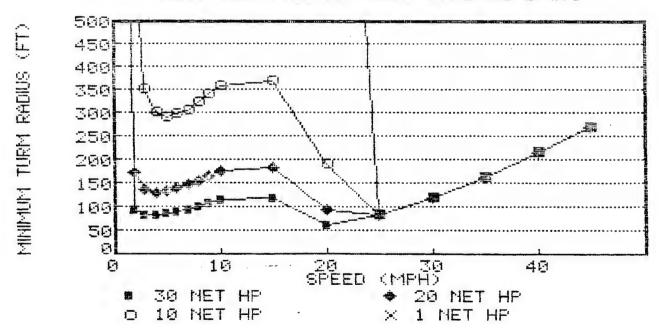
| X Data | 30 NET HP | 20 NET HP | 10 NET HP | 1 NET HP |
|--------|-----------|-----------|-----------|----------|
| 1 | 9108.08 | | | |
| 2 | 95.08 | 173.44 | 984.73 | |
| | 84.55 | 136.40 | 352.76 | |
| 4 | 84.59 | 132.11 | 301.45 | |
| 5 | 87.33 | 134.50 | 292.54 | |
| 6 | 91.34 | 139.66 | 296.52 | |
| 7 | 96.28 | 146.57 | 306.86 | 19534.49 |
| 8 | 102.11 | 155.01 | 321.68 | 9943.98 |
| 9 | 108.97 | 165.11 | 340.61 | 7847.88 |
| 10 | 115.67 | 175.01 | 359.44 | 6962.97 |
| 15 | 121.24 | 182.60 | 369.69 | 4746.54 |
| 20 | 63.59 | 95.49 | 191.67 | 2048.84 |
| 25 | 83.75 | 83.75 | 83.75 | 83.75 |
| 30 | 120.60 | 120.60 | 120.60 | 120.60 |
| 35 | 164.15 | 164.15 | 164.15 | 164.15 |
| 40 | 214.40 | 214.40 | 214.40 | 214.40 |
| 45 | 271.35 | 271.35 | 271.35 | 271.35 |

PART THROTTLE DOWNHILL STEERING LIMITS



| X Data | 30 NET HP | 20 NET HP | 10 NET HF | 1 NET HE |
|----------|-----------|-----------|-----------|----------|
| • | 9108.08 | | | |
| 2 | 95.08 | 173.44 | 984.73 | |
| <u> </u> | 84.55 | 136.40 | 352.76 | |
| 4 | 84.59 | 132.11 | 301.45 | |
| 5 | 87.33 | 134.50 | 292.54 | |
| 6 | 91.34 | 139.66 | 296.52 | |
| 7 | 96.28 | 146.57 | 304.86 | 19534.49 |
| 8 | 102.11 | 155.01 | 321.68 | 9943.98 |
| 9 | 108.97 | 165.11 | 340.61 | 7847.88 |
| 10 | 115.67 | 175.01 | 359.44 | 6962.97 |
| 15 | 121.24 | 182.60 | 369.69 | 4746.54 |
| 20 | 43.59 | 95.49 | 191.67 | 2048.84 |
| 25 | 83.75 | 83.75 | 83.75 | 83.75 |
| 30 | 120.60 | 120.60 | 120.60 | 120.60 |
| 35 | 164.15 | 164.15 | 164.15 | 164.15 |
| 40 | 214.40 | 214.40 | 214.40 | 214.40 |
| 45 | 271.35 | 271.35 | 271.35 | 271.35 |

PART THROTTLE DOWNHILL STEERING LIMITS



HORSEPOWER SPROCKET

CODE: #2TRIRN

L.M. FERNANDEZ BYIW.E. KODLER

KUN DATE: 60385.01 REV. DATE: 91984

TORQUE 5493.69 4391.93 5349.33 5828,10 5396.85 6220.42 6084.30 5503,36 MAXIMUM ACCELERATION , gs= .5 COEFFICIENT OF FRICTION= ,7 **DUTER SPROCKET** ROT. SPEED DRIVE EFF. @SKY, 2= 82 REGENERATION EFF. = 90 46.79 92.49 178.30 356.10 428.16 266.00 17.71 136.21 (LDE) SRADE, %=-10 HORSEPOWER 372.48 18,03 358.04 (hp) 55,41 107.14 186.83 273.33 151.14 ROLLING RESISTANCE, 16 per ton= 100 (lbft) NUMBER OF SPROCKET TEETH= 11 TORQUE -7047.65 -7918.06 -7779.53 -7519.33 -7188.98 -7066.44 -7140.83 -6010,21 -4892,54 TREAD WIDTH, in= 92.51999 INNER SPROCKET ROT. SPEED TRACK LENGTH, in= 150 RACK PITCH, in= 6.03 66.72 32.82 452,48 14.13 280.72 102,60 140.11 211.61 367.86 (Lthu) HURSEPOWER -420.95 -421.51 (hp) -18.97 -98.82 -381.67 -49.47 -146.89 -191.77 -284.71 GROSS VEHICLE WEIGHT, tons= 19.5 RADIUS TURN 56.54 39.20 52,89 55,72 83,75 36.16 45.09 53.60 120.60 (ft) MAXIMUM VELOCITY , mph= 45 FRONTAL AREA ,in= 57 COEFFICIENT OF DRAG= 1 DATA INPUT: ENGINE GROSS HP= 125 SPEED ACCELERATION LOSS ENGINE HP= 60 LATERAL 0.50 0.50 0.00 0.50 0.04 0.08 0.13 0.27 0.01 RESULTS: (55) VEHICLE (mph) 30.00 1.00 B-119 7.50 10.00 5.00 20.00 25.00

3309.52

502.74

316.79

2326.25

578.75

256.34

-3867.58

535.68

-394.46

164,15

0.50

35.00

1493.14

655.66

186.40

-2986.39

617.97

-351.38

214.40

0.50

40.00

B31.99

733,17

116.14

-2270.73

699.67

-302.50

271.35

0.50

45.00

| CODE;#2TRTKN | | SPROCKET | 33 | HORSEPOWER :W.E. KOOLER L.M. FERNANDEZ | Ĩ. | REV. DATE: Run date:6 | DATE: 91984 DATE:60385.02 | |
|-------------------------------|--|------------------------|---------------------------|--|---------------|--|---|---------------|
| ********* | 中华市场中华市场中华市场中华市场中华市场中华市市市市市市市市市市市市市市市市市 | -400 | **** | ***** | **** | 非非常非常被称称的 医多种 医多种 医多种 医多种 医多种 医多种 医多种 医多种 医多种 医多种 | ******** | **** |
| A SPASS V | 68058 UFHICLE WEIGHT FORES | # 00 t | TREAD MID | | 900 | | | |
| MAXIMUM | MAXIMUM VELOCITY , mph= | | | MININ, IN= 72.31777 LENGTH, In= 150 | . 7 7 7 | COEFFICIENT | T OF FRICTION= | 7. "N |
| ENGINE | ENGINE GROSS HP= 100 | | TRACK PIT | PITCH, in= 6.03 | | MAXIMUM AC | Z | R |
| LOSS EN FRONTAL COEFFIC | LOSS ENGINE HP= 60 FRONTAL AREA ,in= 57 COEFFICIENT OF DRAG= | - | NUMBER OF ROLLING RI | NUMBER OF SPROCKET TEETH= ROLLING RESISTANCE,1b per | 11 ton= | DRIVE EFF. GSR>.2= | 906 | |
| | | | ***** | **** | ****** | *************************************** | ******* | **** |
| VEHICLE SPEED (aph) | VEHICLE LATERAL SPEED ACCELERATION (mph) (gs) | TURN RADIUS (ft) | INI HORSEPOWER (hp) | INNER SPROCKET R ROT. SPEED (rpm) | TORQUE (16ft) | OU HORSEPOWER (hp) | OUTER SPROCKET R ROT, SPEED (rpm) | TORQUE (1bft) |
| 1.00 | 00.0 | 194.88 | -9.94 | .15.40 | .3389.41 | 5.29 | 16.44 | 1691.09 |
| 2.50 | 0.01 | .62.12 | -46.46 | 35.74 | -6828.45 | 42.B5 | 43.87 | 5130.81 |
| B-1 | 0.03 | 64.63 | -92.00 | 71.79 | -6730.42 | 83.80 | 87.41 | 5035.19 |
| 20 | 0.05 | 73.82 | -132,80 | 109.14 | -6390.59 | 116.02 | 129.67 | 4699.36 |
| 10.00 | B0.0 | 86.38 | -167.29 | 147.51 | -5956.53 | 138.97 | 170.90 | 4270.91 |
| 15.00 | 0.17 | 90.75 | -245.55 | - 222.11 | -5806.35 | 201.24 | 255.50 | 4136.77 |
| 20.00 | 0.50 | 53.60 | -381.67 | 280.72 | -7140.83 | 372.48 | 356.10 | 5493.69 |
| 25.00 | 0.50 | 83.75 | -420.95 | 367.86 | -6010.21 | 358.04 | 428.16 | 4391.93 |
| 30.00 | 0.50 | 120.60 | -421.51 | 452.48 | -4892.54 | 316.79 | 502.74 | 3309.52 |
| 35.00 | 0.50 | 164.15 | -394.47 | 535.68 | -3867.59 | 256.34 | 578.75 | 2326.25 |
| 40.00 | 0.50 | 214.40 | -351,38 | 617.97 | -2986.39 | 186.40 | 655.66 | 1493.14 |
| 45.00 | .50 | 271.35 | -302.50 | - 19.64 | -2270 | 116.14 | 733,17 | 831.99 |

CODE:#21RTRN SPROCKET HORSE
BY:W.E. RODE

T HORSEPOWER BY:W.E. RODLER L.M. FERNANDEZ

REV. DATE: 91984 RUN DATE: 60385.04

| ************************************** | | | ********* | **** | ***** | 非非常不幸,我们们们们的,我们们的一个,我们的时候,我们的我们的,我们们们的,我们们的人们的,我们的人们的人的,我们们的人们的人们的人们的人们的人们的人们的人们的人们的人们的人们的人们的人们的人 | ******* | **** |
|--|---|----------------------------|---|--|--|--|---|--|
| GROSS VEHICLE MAXIMUM VELOC ENGINE GROSS LOSS ENGINE P FRONTAL AREA COEFFICIENT | GROSS VEHICLE WEIGHT, tons= MAXIMUM VELOCITY, Aph= 45 ENGINE GROSS HP= 90 LOSS ENGINE HP= 60 FRONTAL AREA, in= 57 COEFFICIENT OF DRAG= 1 | , tons= 19.5 h= 45 1 | TREAD WIDS TRACK LENG TRACK PITG NUMBER OF ROLLING RE | TREAD WIDTH,in= 92.51999 TRACK LENGTH,in= 150 TRACK PITCH,in= 6.03 NUMBER OF SPROCKET TEETH= ROLLING RESISTANCE,ID per | 11 ton= | GRADE, %=-10 COEFFICIENT MAXIMUM·ACCE DRIVE EFF. 0 | GRADE, %=-10 COEFFICIENT OF FRICTION= MAXIMUM·ACCELERATION , gG= DRIVE EFF, GSR>, 2= 82 REGENERATION EFF,= 90 | 7. man |
| RESULTS VEHICLE LATE SPEED ACCELE (aph) (9s | RESULTS: VEHICLE LATERAL TUR SPEED ACCELERATION RADI | | ************************************** | ************************************** | ************************************** | ************************************** | ************************************** | ************************************** |
| 1.00 | 0.00 | 80.8016 | -2.57 | 15.91 | -849.16 | -2.58 | 15.93 | -849.16 |
| 2.50 | 0.00 | 87.14 | -41.72 | 36.90 | -5937, 38 | 34.47 | 42.70 | 4239.74 |
| B-1 | 0.02 | 87.33 | -83.35 | 73.82 | -5930,15 | 68.85 | 85.39 | 4234.92 |
| | 0.04 | 80.66 | -118.25 | 111.76 | -5557,25 | 93.52 | 127.05 | 3866.02 |
| 10.00 | 90.0 | 115.67 | -145.44 | 150.47 | -5076.39 | 108.42 | 167.94 | 3390.78 |
| 15.00 | 0.12 | 121.24 | -211.95 | 226.31 | -4918.88 | 155.47 | 251.30 | 3249.30 |
| 20.00 | 0.42 | 63.59 | -368.21 | 286.63 | -6746.88 | 340.02 | 350.18 | 5099.74 |
| 25.00 | 0.50 | 83.75 | -420.95 | 347.86 | -6010.21 | 358.04 | 428.16 | 4391.93 |
| 30.00 | 0.50 | 120.60 | -421.51 | 452.48 | -4892.54 | 316.79 | 502.74 | 3309.52 |
| 35.00 | 0.50 | 164.15 | -394.47 | 535.68 | -3867.59 | 256.34 | 578.75 | 2326.25 |
| 40.00 | 0.50 | 214.40 | -351.38 | 617.97 | -2986.39 | 186.40 | 655.66 | 1493.14 |
| 45.00 | 0.50 | 271.35 | -302.50 | 19.669 | -2270.73 | 116.14 | 733.17 | 831.99 |

CODE: #2TRIRN

SPROCKET HORSEFOWER BY:W.E. KODLER L.M. FERNANDEZ

REV. DATE: 91964 RUN DATE:60385.05

| GROSS V MAXIMUN ENGINE LOSS EN FRONTAL | GROSS VEHICLE WEIGHT, tons= 19 MAXIMUM VELOCITY, wph= 45 ENGINE GROSS HP= 200 LOSS ENGINE HP= 60 FRONTAL AREA, in= 57 COEFFICIENT OF DRAG= 1 | , tons= 19.5 h= 45 1 | TREAD WID TRACK LEN TRACK PIT NUMBER OF ROLLING K | TREAD WIDTH,in= 92.51999 TRACK LENGTH,in= 150 TRACK PITCH,in= 6.03 NUMBER OF SPROCKET TEETH= ROLLING RESISTANCE,1b par | 11 ton= | GRADE, %=-10 COEFFICIENT OF FRIC MAXIMUM ACCELEKATIC DRIVE EFF. #SR>, 2= 100 REGENERATION EFF.= | GRADE,%=-10 COEFFICIENT OF FRICTION= MAXIMUM ACCELERATION,gs# DRIVE EFF, @SR>,2= 82 REGENERATION EFF,= 90 | 92 . 5 |
|--|--|----------------------------|---|--|--|---|---|------------------------------|
| FESULTS: VEHICLE LATER(SPEED ACCELER((aph) (95) | FESULTS: VEHICLE LATERAL TURN SPEED ACCELERATION RADIUS (mph) (gs) (ft) | | ************************************** | ************************************** | ************************************** | ************************************** | ************************************** | ******** TORQUE (1bft) |
| 1.00 | 0.00 | 18.07 | -17.29 | 10.33 | -8793.15 | 29.06 | 21.51 | 7094.84 |
| 2.50 | 0.03 | 16.04 | -40.76 | 24.06 | -8897.13 | 76.13 | 55.54 | 7199.49 |
| B-12 | 60.0 | 17.97 | -86.26 | 51.50 | -8796.37 | 145.62 | 107.70 | 7101.13 |
| 2 | 0.18 | 20.80 | -136.68 | 82.98 | -8650.86 | 206.49 | 155.83 | 6959.63 |
| 10.00 | 0.27 | 24.45 | -190.04 | 117.89 | -8466.32 | 258.87 | 200.51 | 6780.71 |
| 15.00 | 0.50 | 30.15 | -293.78 | 188.55 | -8183,34 | 358.50 | 289.06 | 6513.76 |
| 20.00 | 0.50 | 53.60 | -381.67 | 280.72 | -7140.83 | 372.48 | 356.10 | 5493.69 |
| 25.00 | 0.50 | 83.75 | -420.95 | 347.86 | -6010.21 | 358.04 | 428.16 | 4391.93 |
| 30.00 | 0.50 | 120.60 | -421.51 | 452.48 | -4892.54 | 316.79 | 502,74 | 3309.52 |
| 35.00 | 0.50 | 164.15 | -394.47 | 535.68 | -3867.59 | 256.34 | 578.75 | 2326.25 |
| 40.00 | 0.50 | 214.40 | -351.38 | 617.97 | -2986.39 | 186.40 | 655.66 | 1493,14 |
| 45.00 | 0.50 | 271.35 | -302.50 | 649.67 | -227 | 116.14 | 733.17 | 831.99 |

SPROCKET HORSEPOWER BY:W.E. KODLER L.M. FERNANDEZ CODE: #27RTRN

REV. DATE: 91984 KUN DATE:60385.06

| ###################################### | FESULTS: VEHICLE LATERAL SPEED ACELERATION RAD (mph) (gs) (ft 1.00 0.01 9. 2.50 0.05 9. 2.50 0.05 10. |
|--|--|
| 1.0 | 14.24 -151.03 |
| 3.7 | 30.15 -293.78 53.40 -381.67 |
| 0.9 | 83,75 -420,95 |
| 1.51 | 120.60 -421.51 |
| 4.47 | 164.15 -394.47 |
| 11.38 | 214.40 -351,38 |
| 12.50 | 271.35 -302.50 |

CODE: #2TRIKN

HORSEFOWER SPROCKET

L.M. FERNANDEZ BY: W. E. RODLER

KUN DATE: 60385.07 REV. DATE: 91984

(1bft) TORQUE 7714.52 7664.55 7601.92 7343.92 6513.76 5493.69 4391.93 3309,52 2326.25 7712.57 MAXINUM ACCELERATION ,gs= .5 COEFFICIENT OF FRICTION= **OUTER SPROCKET** ROT. SPEED DRIVE EFF. @SR>.2= 82 REGENERATION EFF. = 90 31.66 502.74 (rpm) 148.27 208,15 234.59 289.06 356.10 42B.16 578.75 78.89 BRADE, %=-10 HORSEPOWER (hp) 216,38 328.02 372,48 316.79 46.50 115.85 358.50 358.04 301.27 256.34 ROLLING RESISTANCE, 1b per ton= 100 (1bft) NUMBER OF SPROCKET TEETH= 11 TORQUE -9412.88 -9359.79 -9410.20 -9293.14 -9029.54 -7140.83 -4892.54 -3867.59 -8183,34 -6010.21 TREAD WIDTH, in= 92.51999 INNER SPROCKET TRACK LENGTH, 1n= 150 HORSEPOWER ROT. SPEED TRACK PITCH, in= 6.03 0.18 10.93 30.66 83,82 0.71 (rpm) 188.55 280.72 367.86 452.48 535.68 -0.33 -1.28 -19.48 -144.10 -293.78 -54.25 -381.67 -420.95 -421.51 -394.47 GROSS VEHICLE WEIGHT, tons= 19.5 RADIUS 6.42 TURN 6.46 7.35 8.54 13.40 30.15 53.60 83.75 120.60 164.15 (+t) MAXIMUM VELOCITY , mph= 45 INFUT ENGINE GROSS HP= 400 COEFFICIENT OF DRAG= FRONTAL AREA , in= 57 SPEED ACCELERATION LUSS ENGINE HP= 60 VEHICLE LATERAL 0.50 0.50 0.50 0.01 0.06 0.23 0.44 0.50 0.50 0.50 0.50 RESULTS: (56) DATA (aph) 00.1 2.50 10.00 20.00 30.00 15.00 25.00 35.00 40.00 B-124

1493.14

655.66

186.40

-2986.39

417.97

-351, 38

214.40

H31.99

733.17

116.14

-2270

699.67

-302,50

271.35

0.50

45.00

CODE: #2TRIRN

SPROCKET HORSEPOWER BY:W.E. RODLER L.M. FERNANDEZ

REV. DATE: 91984 RUN DATE: 60385.08

| ******* | 7 . ENO . | ************************************** | 7801.38 | 7795.00 | 7757.12 | 7656.54 | 7343.92 | 6513.76 | 5493.69 | 4391.93 | 3309.52 | 2326.25 | 1493.14 | 831.99 |
|---------------------------------------|--|--|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| **** | GRADE, %=-10 COEFFICIENT OF FRICTION= MAXINUM ACCELERATION , 95= DRIVE EFF, @SR>, 2= 82 REGENERATION EFF, = 90 | ************************************** | 36.73 | 90.56 | 168.54 | 219.92 | 234.59 | 289.06 | 356.10 | 428.16 | 502.74 | 578.75 | 455.66 | 733.17 |
| ************************************* | GRADE, %=-10 COEFFICIENT OF FRIC MAXIMUM ACCELERATIO DRIVE EFF. @SR>.2= 100 REGENERATION EFF.** | ************************************** | 54.56 | 134.41 | 248.96 | 320.59 | 328.02 | 358.50 | 372.48 | 358,04 | 316.79 | 256,34 | 186.40 | 116.14 |
| ********** | 199 ITH= 11 per ton= | ************************************** | -9499.69 | -9492.64 | -9452.36 | -9347.76 | -9029.54 | -8183.34 | -7140.83 | -6010.21 | -4892,54 | -3867,58 | -2986.39 | -2270.73 |
| **** | TREAD WIDTH,in= 92,51999 TRACK LENGTH,in= 150 TRACK PITCH,in= 6.03 NUMBER OF SPROCKET TEETH# ROLLING RESISTANCE,1b per | ************************************** | -4.89 | -10.96 | -9.36 | 18.89 | 83.82 | 188.55 | 280.72 | 367.86 | 452,48 | 535.68 | 617.97 | 19.669 |
| **** | TRACK LEI TRACK PII TRACK PII NUMBER OF | ************************************** | 8.84 | 19.81 | 16.84 | -33.62 | -144.10 | -293.78 | -381.67 | -420.95 | -421.51 | -394.46 | -351.38 | -302.50 |
| ***** | tons= 19.5 = 45 | ************************************** | 4.85 | 4.97 | 5.68 | 7.54 | 13.40 | 30.15 | 53.40 | 83.75 | 120.60 | 164.15 | 214.40 | 271.35 |
| " | GROSS VEHICLE WEIGHT, tons= MAXIMUM VELOCITY, mph= 45 ENGINE GROSS HP= 500 LOSS ENGINE HP= 60 FRONTAL AREA, in= 57 COEFFICIENT OF DRAG= 1 | ###################################### | 0.01 | 80.0 | 0.29 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| DATA INPUT: | GROSS VEHICLE WEIG MAXIMUM VELOCITY, ENGINE GROSS HP= 5 LOSS ENGINE HP= 60 FRONTAL AREA, in= COEFFICIENT OF DRA | RESULTS: VEHICLE LATERAL SPEED ACCELERATION RADI | 1.00 | 2.50 | 5.00 | B-1 | 25 | 15.00 | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 | 45.00 |

| ~ | |
|--|--|
| 3 | |
|] | |
| 1111 | |
| 12.11 | |
| 1 | |
| <u>. </u> | |
| 11/2 | |
| | |
| L | |
| | |
| | |
| | |

REV. DATE: 6/3/85 KUN DATE: 60385.10 BYIW.E. KUDLEK L.M. FERNANDEZ CODE # 3 THTIN

| *** | | CUEFFICIENT OF DRAGE 1 | KOLLING WEBISTANCE, 16 per | KOLLING REBIBTANCE, 16 per | b pur ton= 100 | | DKIVE EFF. GSR>, 2m B2 REGENERATION EFF.m 90 | |
|--|--|------------------------|--|-----------------------------------|--|--|---|--|
| FALL TIES BY VEHICLE LATERA SPEED ACCELLIN (mph) | Feet Call Test Collection (for Capet) Appendix Collection Collection (for Capet) (for Capet) (for Capet) (for Capet) (for Capet) (for Capet) (for Capet) (for Capet) (for Capet) (for Capet) (for Capet) (for Capet) (for Capet) | | ************************************** | INNER SPRUCKET R KOT, SPEED (rpm) | ************************************** | ************************************** | ************************************** | ************************************** |
| 45,00 | 0.50 | 271.35 | -302,50 | 699.67 | -2270.73 | 116.14 | 735.17 | 831.99 |
| 40.00 | 0.50 | 214.40 | -351.38 | 617.97 | -2986.39 | 186.40 | 655.66 | 1493.14 |
| 35.00 | 0.20 | 164.15 | -394.47 | 535,68 | -3867.59 | 286.34 | 570.75 | 2326.25 |
| 30.00 | 0.50 | 120.60 | -421.51 | 452.40 | -4892,54 | 316.79 | 502.74 | 3309.82 |
| 25, 00 | 0.00 | H3.75 | -420.95 | 347.86 | -6010,21 | 358.04 | 42B.14 | 4391.93 |
| 20.00 | 0.42 | 63.59 | -368.21 | 286.63 | -6746.88 | 340.02 | 350,10 | 5099.74 |
| 15.00 | 0.12 | 121.24 | -211.95 | 226.31 | -4918.88 | 155.47 | 251, 30 | 3249.30 |
| 10.00 | 90.0 | 115.67 | -145,44 | 150.47 | -5076,39 | 108.42 | 167.94 | 3390,70 |
| 9.00 | 0.0 | 108.47 | -135,26 | 134,94 | -5264.50 | 103,25 | 151.63 | 3576.45 |
| u.00 | 0.04 | 102.11 | -124.30 | 117.45 | -5465.50 | 97.24 | 135.20 | 3775.27 |
| 7.00 | 0.03 | 96.28 | -111.80 | 104, 10 | -5643,54 | 69.37 | 118.79 | 3951,39 |
| 6.00 | 0.03 | 91.34 | -98.15 | 60.00 | -5799.63 | 79.86 | 102.16 | 4100,80 |
| 5,00 | 0.02 | H7.33 | -83.3E | 73,82 | -5930,15 | 5B.85 | 65.89 | 4234,92 |
| 4.00 | 0.01 | 64.59 | -67,53 | 56.91 | -6021.08 | 56.37 | 68.46 | 4324.69 |
| 3.00 | 0.01 | 84.85 | -50.66 | 44.18 | -6023.07 | 42.29 | 51.35 | 4325.78 |
| 2.00 | 0.00 | 95.00 | -32.16 | 29.72 | -5683.72 | 25.7B | 33.97 | 3985,79 |
| 1.00 | | | | | | | | |

| 11 | 1 |
|--------|-----------|
| CIFCLE | SOB ER |
| - | = |
| | =, |
| | _ |
| = | 1, |
| 0 | - |
| 7 | EV. W. F. |
| _ | > |
| | 1 |
| - | |
| :.1 | |
| - | |
| 7 | |
| DEROCK | |
| Ξ. | |
| J | |
| 17 | |
| - | |
| 1 | |
| 11 | |
| ** | |
| | |
| | |
| | |
| | |

MU30

REV. DATE: 6/3/05

TRACK FITCH,in= 6.03 NAVIMUM ACCELEMATION, 9s= .5 NUMBER OF SPROCKET TEETH= 11 DRIVE EFF. 9SR>.2= 82 NOLLING KESISTANCE,15 per ton= 100 REGENERATION EFF.# 90 GRADE, X=-10 CUEFFIGIENT OF FRICTION= .7 KUN DATE 60385, 11 TREAD WIDIH, in= 92.51999 TRACK LENGTH, In= 150 BYRW.E. NUDELEN GROSS VEHICLE WEIGHT, tons= 19.5 MAXINUM VELUCITY , mph= 45 ENGINE GROSS HP= 80 FRONTAL AREA ,1n= 57 COEFFICIENT OF DRAG= 1 CORS ENGINE HP# 60 CODE: #3TRTKN

| RESULTES VEHICLE LATERA SPEED ACCELER (mph) (gs) | FRESLIL TESS VEHICLE LATEKAL TUKN INNEK BFKUCKET VEHICLE LATEKAL TUKN INNEK BFKUCKET SPEED ACCELERATION KADIUS HOKSEPUWEK KUT. SPEED TOKGUE HOKSEPOWER KOT. SPEED TOKGUE (mph) (ys) (ft) (hp) (rpm) (lbft) | TUKN KAD LUB (+L) | (pp) NawasePuwaki Mi | INNEK BPRUCKET K KOT, GPEED (rpm) | ET 'D TOKGUE (1bft) | OU HORBEPOWER (hp) | OUTER SPROCKET R ROT, SPEED (rpm) | TOROUE (164t) |
|---|--|-------------------------|----------------------------|---|---------------------------|--------------------------|---|------------------|
| 45,00 | 0.20 | 271.35 | -302,50 | 644.67 | -2270.73 | 116.14 | 73.5, 17 | 66.188 |
| 40.00 | 0.20 | 214.40 | 80.180 | 617.97 | -2906.39 | 186.40 | 99.229 | 1493,14 |
| 32,00 | 0.50 | 164.15 | -394.47 | 832.68 | -3867.59 | 256.34 | 578.75 | 2324.25 |
| 30.00 | 0.50 | 120.60 | -421.51 | 452.48 | -4692,54 | 316.79 | 502,74 | 3309,52 |
| 25.00 | 0.50 | 83.75 | -420.95 | 367.86 | -6010.21 | 358.04 | 428.16 | 4391.93 |
| 20.00 | 0.28 | 95.49 | -319.51 | 297.25 | -5645.37 | 258,50 | 339.56 | 3998.23 |
| 15,00 | 0.08 | 182.60 | -157.31 | 230.51 | -3584,35 | 90.09 | 247.10 | 1914.77 |
| 10,00 | 0.04 | 175.01 | -108.97 | 153,43 | -3730,19 | 64.22 | 164.98 | 2044.57 |
| 9.00 | 0.03 | 165.11 | -102.88 | 137,78 | -3921.77 | 63.28 | 148.79 | 2233,72 |
| 8,00 | 50°0 | 102.01 | -96.05 | 122,15 | -4129.99 | 61.59 | 132.58 | 2439.76 |
| 7.00 | 0.03 | 146.57 | -87.59 | 106.62 | 4314.79 | 58.06 | 116.27 | 2622.63 |
| 6.00 | 0.03 | 139.66 | -77.61 | 91.18 | -4473,73 | 52,80 | 99.66 | 2779.91 |
| 2.00 | 0.01 | 134.50 | -66.39 | 75.85 | -4597.03 | 46.05 | 63.36 | 2901.80 |
| 4.00 | 0,01 | 132,11 | -68.74 | 60.62 | -4655 B1 | 37.61 | 64.74 | 2959.42 |
| 3.00 | 00.0 | 136.40 | 39.47 | 48.84 | -4552, 39 | 27.17 | 49.90 | 2855.10 |
| 2.00 | 00.0 | 173,44 | -21.09 | 30.68 | 5745.B1 | 13.00 | 33.01 | 2067,88 |

CODE: #STRIEN

CHROCKET TORGE (DEED

BY:W.E. RODLER L.M. FERNANDEZ

REV. DATE: 6/3/85 FUN DATE: 60385.13 MAXIMUM ACCELERATION ,gs= .5 COEFFICIENT OF FRICTION= .7 DRIVE EFF. GSR > 2= 82 REGENERATION EFF. = 90 GRADE, X=-10 ROLLING RESISTANCE, 1b per ton= 100 TRACK PITCH, In= 6.03 NUMBER OF SPROCKET TEETH= 11 TREAD WIDTH, in= 92.51999 TRACK LENGTH, INT 150 GROSS VEHICLE WEIGHT, tons= 19.5 MAXIMUM VELOCITY , mph= 45 ENGINE GKOSS HF= 61 COEFFICIENT OF DRAG= 1 FRONTAL AREA ,in= 57 LOSS ENGINE HP= 60 DULTE

| ************************************** | ·数据数据数据数据数据数据数据数据数据数据数据数据数据数据表现表现数据表现表现表现表现 | ******** | ********* | 子字字字字字字字字字字 | ********** | ********* | ******** | ******* |
|--|---|------------------------|---------------------------|---|------------------|---------------------------|---|------------------|
| VEHICLE SPEED (mph) | VEHICLE LATERAL SPEED ACCELERATION (mph) (gs) | TURN RADIUS (ft) | INI HORSEPOWER (hp) | INNER SPROCKET K ROT. SPEED (rpm) | TORQUE (1bft) | OU7 HORSEPOWER (hp) | OUTER SPROCKET R ROT. SPEED (rpm) | TORQUE (1bft) |
| 45.00 | 0.50 | 271.35 | -302,50 | - 29.64 | -2270.73 | 116.14 | 733.17 | 831.99 |
| 40.00 | 0.50 | 214.40 | -4011,00 | 617.97 | -2986.39 | 186.40 | 655.66 | 1493.14 |
| 35.00 | 0.50 | 164.15 | -394.46 | 525.6B | -3867.58 | 256.34 | 578.75 | 2326.25 |
| 30.00 | 0.50 | 120.60 | -421.51 | 452.48 | -4892.54 | 316.79 | 502.74 | 3309.52 |
| 9 B-1 | 0.50 | 83.75 | -420.95 | 367.86 | -6010.21 | 358.04 | 428.16 | 4391.93 |
| Q 128 | 0.01 | 2048.82 | -49,78 | 317.42 | -823.59 | -50.0B | 319.39 | -823.05 |
| 15.00 | 0.00 | 4746.54 | -37.91 | 23B.49 | -834.79 | -38.01 | 239.13 | -834.79 |
| 10.00 | 0.00 | 6962.97 | -28.62 | 159.06 | -842,81 | 18 °55 | 159.35 | -842.81 |
| 00.6 | 0.00 | 7847.88 | -23.01 | 143.17 | -844.03 | -23.04 | 143,40 | -844.03 |
| 8.00 | 00.00 | 9943.98 | -20.48 | 127,28 | -845.12 | -20.51 | 127.44 | -845.12 |
| 7.00 | . 0,00 | 19534.49 | -17.95 | 111.41 | -845.08 | -17.96 | 111.48 | -846,08 |

B.6 A-C Induction Motor Drive System Electrical States

A detailed analysis of the deprating states of all components was made to assure that all components were operating within normal rated limits. The results are given in the following tables:

- 1. 19.5 Ton, Configuration I
- 2. 19.5 Ton, Configuration II
- 3. 40.0 Ton, Configuration I
- 4. 40.0 Ton, Configuration II

The voltage, current and frequencies values have been given vs. vehicle speed to illustrate the operational characteristics. These tables confirmed that there were no peculiar operating points to cause failure of the components.

INDUCTION MOTOR CONFIGURATION 1, GVN= 19.5, ELECTRICAL STATE DATA

(DURING MAXIMUM TRACTIVE EFFORT CONDITION)

| SPEED | | ALTER | NATOR | | | BR | IDGES | (EACH) | MO: | rors(| EACH) |
|-------|-------------------|-------|-------|-------|-----|-------------|-------|--------|-----|-------|-------|
| MPH | EXC | ITER | C | UTPUT | | IN | PUT | | | PUT | |
| | "E" | "I" | "E" | "I" | "F" | "E" | "I" | | "E" | "I" | "F" |
| 1.5 | | | 515 | 410 | 250 | 510 | 205 | ···· | 82 | 1253 | 17 |
| 3.0 | | - | A | 524 | 350 | 3 | 262 | | 120 | 1097 | 33 |
| 4.5 | | | | 524 | 500 | | 262 | | 142 | 924 | 50 |
| 6.0 | | | - | 526 | A | | 263 | | 161 | 817 | 67 |
| 7.5 | | | | 528 | | | 264. | | 179 | 738 | 83 |
| 9.0 | | | | 530 | | | 265 | | 195 | 681 | 100 |
| 10.5 | * | | | 536 | | -10 | 268 | | 210 | 639 | 117 |
| 12.0 | | | | A | | | | 7 | -24 | 600 | 133 |
| 13.5 | | | | | | | | | | 566 | 1 |
| 15.0 | | | | | | | - | | | 539 | |
| 16.5 | | | | | | | . , | | | 515 | |
| 18.0 | | | | | | | | | | 495 | 3 |
| 19.5 | | | | | | | | 2 | | 476 | i |
| 21.0 | | | | | | | | | | 458 | |
| 22.5 | | | | | | / - | | | - | 442 | |
| 24.0 | | | | | | | | | | 426 | |
| 25.5 | | | ļ | | | | | | | 1 | 283 |
| 27.0 | | | ; | | | | 1 - | | | 404 | |
| 28.5 | | | | | | | | | | 393 | 317 |
| 30.0 | | | | | | | | | | 1 | 333 |
| 31.5 | | | | | | ; | | | | 373 | |
| 33.0 | | | | | | | • ; | | | 365 | |
| 34.5 | • | | | | | | | | | 357 | |
| 86.0 | | | | | | : | | | | 349 | |
| 7.5 | | | | | | | | | | 342 | |
| 9.0 | | | | | | , | | | | 335 | |
| 0.5 | ļ | | | | | 4 1 1 | 1 | | | | |
| 2.0 | Total Marie Marie | | | | | - | | | - | 329 | |
| 3.5 | | • | | | | | | | 1 | 322 | |
| 5.0 | | | 515 | Y | A | 1 | A | 4 | 24 | 316 | 48 |

INDUCTION MOTOR CONFIGURATION / , GVW= 407, ELECTRICAL STATE DATA

(DURING MAXIMUM TRACTIVE EFFORT CONDITION)

| SPEED MPH | ALTERNATOR | | | | | BRIDGES (EACH) MOTORS(EACH) | | | | | |
|--------------|------------|-------|--------|----------|-----|-----------------------------|-------|---|-------|------|-----|
| | EXC | CITER | OUTPUT | | | INP | INPUT | | INPUT | | |
| | "E" | "I" | "E" | "I" | "F" | "E" | "I" | | "E" | "I" | "F" |
| 1.5 | | | 412 | 1148 | 550 | 408 | 574 | | | 1471 | |
| 3.0 | | | | 1372 | | | 686 | • | 217 | 1266 | 27 |
| 4.5 | | | | 1364 | 500 |) | 682 | | | 1071 | |
| 6.0 | | | | 1400 | 3 | | 700 | | | 946 | |
| 7.5 | | | | 1398 | | | 699 | | | 856 | |
| 9.0 | | | | 1414 | | ļ | 704 | | | 789 | |
| 10.5 | | | 412 | 1420 | 1 | 408 | 710 | | 385 | 738 | 93 |
| 12.0 | | | 616 | 942 | | 612 | | | 409 | 692 | 10 |
| 13.5 | | | | | | Í | ! | | _ | 654 | |
| 15.0 | | | : | • | | | | | | 622 | |
| 16.5 | | | : | • | | | ; | | | 595 | |
| 18.0 | | | | | | | i | | | 571 | |
| 19.5 | | | | : | 1 | | | | 516 | 549 | 17 |
| 21.0 | | | | : |) | 1 | i | | 535 | 529 | 186 |
| 22.5 | | | 616 | 942 | | 61/2 | 471 | | 556 | 510 | 20 |
| 24.0 | | | 718 | | | 714 | 404 | | 573 | 494 | 21 |
| 25.5 | | | ì | | | İ | l | | 590 | 480 | 22 |
| 27.0 | | | | • | | | | | 608 | 466 | 24 |
| 28.5 | | | | • | | | | | 625 | 3453 | 25 |
| 30.0 | | | | <u>.</u> | | | | | 642 | 441 | 26 |
| 31.5 | | | 718 | 804 | | 714 | 404 | | 657 | 431 | 27 |
| 33.0 | | | 820 | 708 | } | 816 | 354 | | 673 | 421 | 29 |
| 34.5 | * | | i | ? : | 1 | | | | 689 | 411 | 30 |
| 36.0 | | | | | 1 | | | | | 403 | |
| 37.5 | | | 1 | | | | | | | 394 | |
| 39.0 | | | | | | - | | | | 386 | |
| 40.5 | | | • | | | | | | 747 | 379 | 360 |
| 42.0 | | | : | | 1 | | | | 762 | 372 | 37 |
| 43.5 | | | | |) | 1 | , | | 776 | 365 | 38 |
| 45.0 | | | 820 | 708 | 500 | 011 | 2 50 | | 791 | 358 | 40 |

INDUCTION MOTOR CONFIGURATION ______, GVW= 19.5, ELECTRICAL STATE DATA

(DURING MAXIMUM TRACTIVE EFFORT CONDITION)

| SPEED | | ALTER | NATOR | | | BRIDGEX (EACH) MOTORX(EACH) | | | | |
|-------|----------------|-------|-------|------|-----|-----------------------------|-------|-----|------|-----|
| MPH | EXCITER OUTPUT | | | | • | INPUT | INPUT | | | |
| | "E" | "I" | "E" | "I" | "F" | "E" "I" | | "E" | "I" | "F" |
| 1.5 | | | 169 | 1253 | 250 | 166 1253 | | 162 | 1253 | 17 |
| 3.0 | | ! | 249 | | 350 | 246 | - | 240 | 1097 | 33 |
| 4.5 | | 1 | 291. | | 500 | 288 | | | 924 | |
| 6.0 | | | 329 | | - | 326 | | 322 | 817 | 67 |
| 7.5 | | | 365 | | | 3.62 | | | 738 | |
| 9.0 | | | 397 | | | 394 | | | 681 | |
| 10.5 | | | 427 | | | 424 | | | 639 | |
| 12.0 | | | 455 | | | 452 | | | 600 | |
| 13.5 | | | 481 | | | 478 | | | 566 | |
| 15.0 | | | 505 | | | 502 | | 498 | 539 | 16 |
| 16.5 | | | 529 | | | 526 | | 522 | 515 | 18 |
| 18.0 | | | 268 | | | 265 | • | 261 | 1030 | 20 |
| 19.5 | | | 290 | | | 287 | 7 | 283 | 950 | 21 |
| 21.0 | | | 311 | | | 308 | | 304 | 882 | 23 |
| 22.5 | | | 333 | | İ | 330 | | • | 824 | |
| 24.0 | | | 355 | | | 352 | - | 348 | 772 | 26 |
| 25.5 | | | 376 | | .] | 373 | | 369 | 727 | 28 |
| 27.0 | | | 398 | | | 395 | | 391 | 686 | 30 |
| 28.5 | | | 420 | | | 417 | | 413 | 650 | 31 |
| 30.0 | | | 442 | | | 439 | | 435 | 618 | 33 |
| 31.5 | | | 463 | |) | 460 | | 456 | 588 | 35 |
| 33.0 | | | 485 | | | 482 | | 478 | 561 | 36 |
| 34.5 | * | | 507 | | | 504 | | 500 | 537 | 38 |
| 36.0 | | | 529 | | 1 | 526 | ع | 22 | 515 | 40 |
| 37.5 | | | 550 | | | 547 | | 543 | 494 | 41 |
| 39.0 | | | 572 | | | 569 | | | 475 | |
| 10.5 | | | 594 | | | 591 | | | 457 | |
| 2.0 | | | 616 | | | 613 | | | 441 | |
| 3.5 | | | 637 | | | 634 | ! | 630 | 426 | 48 |
| 15.0 | | | 659 | 412 | 500 | 6:56 412 | | 552 | 412 | 50 |

INDUCTION MOTOR CONFIGURATION I, GVW= 407, ELECTRICAL STATE DATA

(DURING MAXIMUM TRACTIVE EFFORT CONDITION)

| SPEED | | ALTER | RNATOR | | | BRIDGES | MOTORS |
|-------|-----|-------|--------|-------|-----|------------|--------------|
| MPH | EXC | ITER | 0 | UTPUT | | INPUT | INPUT |
| | "E" | "I" | "E" | "I" | "F" | "E" "I" | "E" "I" "F" |
| 1.5 | | | 305 | 1471 | 250 | 302 1471 | 298 1471:13 |
| 3.0 | | | 441 | | 350 | 438 | 434 1266 27 |
| 4.5 | | | 517 | | 500 | 514 | 510 1071 40 |
| 6.0 | | | 599 | | | 596 | 592 946 53 |
| 7.5 | | | 661 | | | 658 | 654 856 67 |
| 9.0 | | | 721 | | | 718 | 714 789 80 |
| 10.5 | | | 777 | : | | 774. | 770 738 93 |
| 12.0 | | | 416 | • | | 413 | 4091384 106 |
| 13.5 | | | 410 | | | 407 | 433 1308 120 |
| 15.0 | | | 462 | | | 459 | 455 1244 133 |
| 16.5 | | | 483 | : | | 480 | 476 1190 146 |
| 18.0 | | | 503 | | | 500 | 496 1142 160 |
| 19.5 | | | 523 | | ļ | 520 | 5161098 173 |
| 21.0 | | | 542 | | | 539 | 535 1058 186 |
| 22.5 | | | 563 | • | | 560 | 556/02020 |
| 24.0 | | | 600 | | | S77 | 573 988 213 |
| 25.5 | | | 597 | | | 594 | 590 960 227 |
| 27.0 | | | 615 | | | 612 | 608 932 24 |
| 28.5 | | | 632 | | | 629 | 625 906 25 |
| 30.0 | | | 649 | 1 | | 646 | 642 882 26 |
| 31.5 | | | 664 | | | 661 | 657 862 27 |
| 33.0 | | | 670 | | | 667 | 673 842 29 |
| 34.5 | • | | 696 | | | 693 | 689 822 30 |
| 36.0 | | | 710 | | | 707 | 703 806 32 |
| 37.5 | | | 726 | | | 723 | 719 788 33 |
| 39.0 | | | 740 | | | 737 | 734 772 34 |
| 40.5 | | | 754 | | | 751 | 74775836 |
| 42.0 | | | 769 | | | 766 | 767 744 37 |
| 43.5 | | | 783 | : | | 780 | 77673038 |
| 45.0 | | | 798 | 358 | 500 | 795 358 | 791 358 40 |
| | | | | | | | |

B-133

B.7 Homopolar Motor Drive System Electrical States

A detailed analysis of the operating states of all components was made to assure that they were operating within normal rated limits. The results are given in the following tables:

- 1. 19.5 Ton, Configuration I
- 2. 40.0 Ton, Configuration I

The voltage and current values have been given tabulated vs. vehicle speed to illustrate the operational characteristics. These tables confirmed that there were no peculiar operating points to cause failure of the components.

ELECTRIC VEHICLE MISSION SIMULATION

DC HOMOPOLAR MOTOR DRIVE System

FMC / NORTHERN ORDNANCE DIVISION MINNEAPOLIS, MINNESOTA USA

REVISION DATE: 04/05/85 RUN DATE: 08-22-1985

ELECTRICALLY DRIVEN, TRACKED VEHICLE PERFORMANCE IS SIMULATED BY THIS PROGRAM. DETAILED ASPECTS OF VEHICLE PERFORMANCE CAN BE INVESTIGATED USING THE FOUR RESIDENT SUB-PROGRAMS LISTED BELOW. THE SUB-PROGRAM IN USE IS IDENTIFIED WITH AN ASTERISK.

* 1.) ELECTRIC DRIVE PERFORMANCE

STEADY STATE VEHICLE PERFORMANCE ANALYSIS WITH DETAILED EMPHASIS ON ELECTRIC POWER DRIVE PARAMETERS. ENERGY USAGE, HEAT REJECTION, AND FUEL IMPACT ARE ALS CALCULATED.

2.) VEHICLE ACCELERATION PERFORMANCE

1

DYNAMIC VEHICLE PERFORMANCE ANALYSIS WHICH REALISTICALLY SIMULATES GROSS VEHICLE MISSION OVER ALL TERRAIN CONDITIONS. ACCELERATION, DECELERATION, BRAKING AND MISSION OVER ALL TERRAIN CONDITIONS. ACCELE CONSTANT VELOCITY CONDITIONS ARE CONSIDERED.

3.) ACCELERATION DYNAMICS ROUTINE

t

INCREMENTAL DYNAMIC DETAILED ANALYSIS OF FULL POWER VEHICLE ACCELERATION DURING TURNING AND NON-TURNING MANEUVERS ON USER SELECTED GRADES AND SURFACES. INCREMENTAL FARAMETERS ARE GENERATED AND TABULATED.

> 1 4.) REDUCTION DYNAMICS ROUTINE

B-135

DETAILED ANALYSIS OF SPEED/TORQUE LOADING OF ALL VEHICLE POWER TRAIN REDUCTION FINAL SPROCKET DRIVES AND DIESEL ENGINE INTERFACE ARE INCLUDED IN ELEMENTS. ANALYSIS. VEHICLE DATA COURSE: DATA INPUT BY USER DATE COURSE

GROSS VEHICLE WEIGHT, tons= 19.5 57

FRONTAL AREA, sq. ft.= TREAD WIDTH, in. = 92.5 COEFFICIENT OF DRAG= 1

COEFFICIENT OF FRICTION= .7

SURFACE: COMPACTED SOIL

PERFORMANCE LIMITS

TRACK LENGTH, in. = 150

TRACK PITCH, in. = 6.03 MAX. COURSE VELOCITY, mph= 45 MAX. LAT. ACCEL., g's= .5

NUMBER OF SPROCKET TEETH= 11

ROLLING RESISTANCE, 1b. per ton= 100

MAXIMUM VELOCITY, mph= 45

MAX. FOWER, hp= 500 ENGINE: VTA-903

٥ 6 PEAK MOTOR EFF., %= BENERATOR EFF., %=

TYPE: HoPol P-6

DHUD

DRIVE

ENGINE DATA

CIMPOMIM

MOTOR KM V/Krpm-A= .005 . G 2100 3EN. KG, V/Krpm-A= .005

INLET/EXHAUST LOSSES, % Ghp=

SPEED FOR MIN. FUEL, rpm=

MAX. SPEED, rpm= 2960

COOLING LOSSES, % Ghp=

FUEL CAPACITY, gal. = 175 AUXILIARY POWER hp= 6

SCHEDULING: CONSTANT

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 17.31 | | NET DRIVE | EFFICIENCY (%) 29.46 | | FUEL ECONOMY (mpg) 0.10 | | | WER 7 | D POWER (Kw) 15.0 |
|------------|--------------------------------------|----------|---|-------------|-----------|---|----------|---|----------|----------------|---|--|
| | ENGINE SCHEDULING CONSTÂNT | | AVG. FORWARD VELOCITY (mph) 2.50 | | | TORQUE (ft—1b) 9686.34 | | FUEL REMAINING (gal.) 173.09 | | SPROCKET MOTOR | HORSEFOWER (hp) 75.67 | 구 그 |
| | SCHE | | | * * * | SPROCKET | SPEED (rpm) 39.80 | * | | | OUTER SPROCK | TORQUE (ft-1b) 599.16 | CURRENT (amps) 135278.50 |
| * * * | ENGINE | * * * * | CUMMULATIVE TIME (sec) 272.73 | 1 | OUTER SPR | HORSEPOWER (hp) 73.40 | *** | FUEL CONSUMED (gal.) 1.915 | *** | OO | SPEED (rpm) 663.35 | VOLTAGE (volts) 1.00 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 1000 | MANCE DATA | | TORQUE HORS (ft-1b) 9686.34 | AGY DATA | FUEL CONSUMPTION (1b/hr) 199.18 | VE DATA | MOTOR | HORSEPOWER (hp) 75.67 | FIELD FOWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | A COURSE | TIME (sec) 272.73 | PERFORMANCE | SPROCKET | SPEED (rpm) 39.80 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | IC DRIVE | SPROCKET MO | TORQUE H((ft-1b) 599.16 | CURRENT (amps) 135278.50 |
| MISSIM | MAX. VELUCITY (mph) 45.00 | NOISSIM | GRADE RADIUS (%) (ft) 60 0 | VEHICLE | INNER | HORSEPOWER (hp) 73.40 | ENGINE | SEGMENT ENERGY LOSS (btu) 67756.57 | ELECTRIC | INNER | SPEED (rpm) 663.35 | VOLTAGE ((volts) |
| * * * | SURFACE | *** | DISTANCE GR (ft) (1000 6 | > *** | | LATERAL ACCELERATION (g's) 0.000 | ** | CUMMULATIVE ENERGY USED (btu) 96056.88 | ** | | GENERATOR FOWER (Kw) 269.21 | BUSS CURRENT (amps) 270557.00 |
| | | | SEGMENT NO. (#) | | | TRACTIVE EFFORT (K-1bs) 22.02 | | SEGMENT ENEKGY (btu) 96056.88 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) |
| | COURSE DATA INPUT BY USER | | LAP NO. (#) | | | FORWARD VELOCITY (mph) | -136 | HORSEPOWER GENERATED (hp) 498.30 | | | 98 J. | |

| | ELECTRIC DRIVE TYPE HOPOI P-G | | RANGE ESTIMATE (miles) 20.69 | | . FAN | EFFICIENCY (%) 34.24 | | FUEL ECONOMY (mpg) 0.12 | | | M MER | OWER S. |
|------------|-------------------------------------|----------|---|-------------|----------------|---|------------------|--|----------|----------------|---|--|
| | ENGINE SCHEDULING CONSTANT | | G. FORWARD VELOCITY (mph) 2.73 | | | TORQUE (ft-1b) .9411.56 | | FUEL REMAINING (gal.) 171.48 | | SPROCKET MOTOR | HORSEPOWER (hp) 88.23 | FIELD POWER (Kw) 15.0 |
| | SCHEI | | Ą | * * * | ROCKET | SPEED (rpm) 47.76 | <u>.</u> | | | OUTER SPROCKE | TORQUE (ft-1b) 582.16 | CURRENT (amps) 113163.40 |
| * * | ENGINE CTA-903 | * * * | CUMMULATIVE TIME (sec) 500.00 | 1 | OUTER SPROCKET | HORSEFOWER (hp) 85.59 | * * * * | 00 | *** | .00 | SPEED (rpm) 796.02 | VOLTAGE (valts) 1.19 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 2000 | ANCE DATA | | TORQUE HOR (ft-1b) 9411.56 | REY DATA | FUEL CONSUMPTION (1b/hr) 199.97 | ZE DATA | OR . | HORSEPOWER (hp) 88.23 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | N COURSE | TIME (sec) 227.27 | PERFORMANCE | SPROCKET | SPEED (rpm) 47.76 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | IC DRIVE | SPROCKET MOTOR | TORQUE HC (ft-1b) 582.16 | CURRENT (amps) |
| MISSIM | MAX. VELOCITY (mph) 45.00 | MISSION | SE RADIUS (ft) | ICLE | INNER | HORSEPOWER (hp) 85.59 | ENGINE | SEGMENT ENERGY LOSS (btu) 52813.05 | ELECTRIC | INNER | SPEED (rpm) 796.02 | VOLTAGE (valts) 1.19 113 |
| * * * | SURFACE COMPACTED SOIL | *** | DISTANCE GRADE (#1) (%) 1000 57.5 | 工山> *** | | LATERAL ACCELERATION (g's) 0.000 | * * * | CUMMULATIVE ENERGY USED (btu) 176367.40 | *** | | GENERATOR POWER (KW) 270.24 | BUSS CURRENT (amps) 226326,80 |
| | | | SEGMENT NO. (#) 2 | | | TRACTIVE EFFORT (K-1bs) 21.39 | | SEGMENT ENERGY (btu) 80310.51 | | | GENERATOR SPEED (rpm) 10400,00 | BUSS VOLTAGE (volts) 1.19 |
| | COURSE DATA INPUT BY USER | | LAP NG. (#) | | | FORWARD VELOCITY (mph) 3.00 | B-137 | HORSEPOWER GENERATED (hp) 499.93 | , | | GE 17 | |

常本常常 ELECTRIC DRIVE PERFORMANCE ***

| | ELECTRIC DRIVE TYPE HOPOI P-G | | RANGE ESTIMATE (miles) 31.05 | | NET DRIVE | EFFICIENCY (%) 46.25 | | FUEL ECONOMY (mpg) 0.18 | | | WER 5 | FIELD POWER (Kw) |
|------------|--------------------------------------|---------|---|-------------|-----------|---|----------|--|----------|----------------------|---|--|
| | ENGINE SCHEDULING | | AVB. FORWARD VELOCITY (mph) 3.14 | | | TORQUE (+t-1b) 8471.20 | | FUEL REMAINING (gal.) 170.42 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 119.13 | |
| | 9 H H G G | | | *** | SPROCKET | SPEED (rpm) 71.64 | J, | L MED ., | | ER SPROCK | TORQUE (ft-1b) 523.99 | CURRENT (amps) 75399,44 |
| *** | ENGINE | *** | CUMMULATIVE TIME (sec) 651.52 | 1 | OUTER SPR | HORSEPOWER (hp) 115.55 | *** | FUEL CONSUMED (gal.) 1.067 | 事事事事 | דטס | SPEED (rpm) 1194.03 | VOLTAGE (volts) 1.79 |
| PARAMETERS | VEHICLE 19.5 TON | E DATA | CUMMULATIVE DISTANCE (ft) 3000 | ANCE DATA | | TORQUE HOR((ft-1b) 8471.20 1: | GY DATA | FUEL CONSUMPTION (1b/hr) 199.85 | E DATA | K. | HORSEPOWER (hp) 119.13 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (q's) 0.50 | COURSE | TIME (sec) 151.52 | PERFORMANCE | SPROCKET | SPEED (rpm) 71.64 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MOTOR | TORGUE HOF (+t-1b) 523.99 | CURRENT F) (amps) 75399,44 |
| MISSION | MAX. VELOCITY (mah) 45.00 | MISSION | DE RADIUS (ft) | VEHICLE | INNER SF | HORSEPOWER (hp) 115,55 | ENGINE | SEGMENT ENERGY LOSS (btu) 28764.16 | ELECTRIC | INNER | SPEED TO (rpm) (4 | VOLTAGE CL (volts) (a |
| *** | SURFACE COMPACTED SOIL | *** | DISTANCE GRADE (%) (%) 1000 49.5 | *** | | LATERAL ACCELERATION (9's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 229881.60 | *** | | GENERATOR POWER (Kw) 270.09 | BUSS CURRENT (amps) 150798,90 |
| | | | SEGMENT NO. (#) 3 | | | TRACTIVE EFFORT (K-1bs) 19.25 | | SEGMENT ENERGY (btu) 53514,22 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 1.79 |
| | COURSE DATA INPUT BY USER | | LAP NO. (#) | | | FORWARD VELOCITY (mph) | -138 | HORSEPOWER GENERATED (hp) 499.69 | | | 96 | |

| | ELECTRIC DRIVE TYPE HaPal P-G | | RANGE ESTIMATE (miles) 41.58 | | | NEI DRIVE EFFICIENCY (%) 54.83 | | FUEL ECONOMY (mpg) 0.24 | | | JER | o o |
|------------|-------------------------------------|---------|---|--------------------|----------------|---|----------------|--|----------|----------------------|---|--|
| | ENGINE SCHEDULING | | AVG. FORWARD VELOCITY (mph) 3.57 | | | TORQUE (ft—1b) 7504.59 | | FUEL REMAINING (gal.) 169.62 | | ET MOTOR | HORSEPOWER (hp) 140.71 | FIELD POWER (Kw) 15.0 |
| | SCHE | | | * * * | OCKET | SPEED (rpm) 95.52 | ¥ | it. .) . 97 | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 464.20 | CURRENT (amps) 56312.49 |
| * * | ENGINE VTA-903 | ** | CUMMULATIVE TIME (sec) 765.15 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 136.49 | * * | FUEL CONSUMED, (gal.) 0.797 | *** | TUO | SPEED (rpm) 1592.04 | VOLTAGE (volts) 2.39 |
| FARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 4000 | AANCE DATA | | TORGUE HORS (ft-1b) (7504.59 13 | RBY DATA | FUEL CONSUMPTION (1b/hr) 198.99 | JE DATA | OR | HORSEPOWER (hp) 140.71 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | COURSE | TIME (sec) 113.64 | PERFORMANCE | SPROCKET | SPEED (rpm) 95.52 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | INNER SPROCKET MOTOR | TORGUE HC (+t-1b) 464.20 | CURRENT F (amps) 56312.49 |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | NOISSIM | GRADE RADIUS (%) (ft) 42 0 | VEHICLE F | INNER | HDRSEFOWER (hp) 136.49 | ENGINE | SEGMENT ENERGY LOSS (btu) 18065.08 | ELECTRIC | INNER | SPEED T (rpm) (| VOL TAGE C (volts) (2.39 56 |
| * * * | SURFACE | *** | DISTANCE GF (ft) (1000 | > * * * | | LATERAL ACCELERATION (g's) 0.000 | * * * | CUMMULATIVE ENERGY USED (btu) 269872,60 | *** | | GENERATOR POWER (Kw) 268.96 | BUSS CURRENT (amps) 112625.00 |
| | | | SEGMENT NO. (#) 4 | | | TRACTIVE EFFORT (K-1bs) 17.06 | | SEGMENT ENERGY (btu) 39991.02 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 2.39 |
| | COURSE DATA INFUT BY USER | | LAP NO. S (#) | , | | FORWARD VELOCITY (mph) 6.00 | B - 139 | HORSEPOWER GENERATED (hp) 497.89 | | | GE 10 | |

半半半半 ELECTRIC DRIVE PERFORMANCE ***

| | ELECTRIC DRIVE TYPE | HaPol P-G | | RANGE ESTIMATE (miles) 51.98 | | NET DRIVE | EFFICIENCY (%) 60.03 | | FUEL ECONOMY (mpg) 0.30 | | | ਸ | WER. |
|----------------|------------------------|--------------------|----------|---|-------------|-----------|--|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING | CONSTANT | | AVG. FORWARD VELOCITY (mph) 3.98 | | | TORQUE (ft—1b) .6573.10 | | FUEL REMAINING (gal.) 168.98 | ÷ | T MOTOR | HORSEPOWER (hp) 154.06 | FIELD POWER (Kw) 15.0 |
| | ENG | CONS | | | *** | SPROCKET | SPEED (rpm) 119.40 | <u>ú</u> | | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 406.58 | CURRENT (amps) |
| *** | ENGINE | VTA-903 | *** | CUMMULATIVE TIME (sec) 856.06 | 1 | OUTER SPR | HORSEPOWER (hp) 149.44 | *** | FUEL CONSUMED (gal.) 0.638 | *** | TUO | SPEED (rpm) 1990.05 | VOLTAGE (valts) 2.99 |
| PARAMETERS | VEHICLE | 19.5 TON | E DATA | CUMMULATIVE DISTANCE (ft) 5000 | ANCE DATA | | TOKQUE HORS (ft-1b) 6573.10 1 ⁴ | GY DATA | FUEL CONSUMPTION (1b/hr) 198.97 | E DATA | ŭ | HORSEFOWER (hp) 154.06 | FIELD POWER (Kw) 15.0 |
| 1 | MAX. LAT. ACCEL. | (g's) 0.50 | A COURSE | TIME (sec) 90.91 | PERFORMANCE | SPROCKET | SPEED ((rpm) (| / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | INNER SPROCKET MOTOR | TORGUE HOR(ft-1b) | CURRENT FIE (amps) 45047.25 |
| NOISSIM | MAX. VELOCITY | (mph) 45.00 | MISSION | RADE RADIUS (%) (ft) 35.3 0 | VEHICLE | INNER | HORSEPOWER (hp) 149.44 | ENGINE | SEGMENT ENERGY LOSS (btu) 12786.72 | ELECTRIC | INNER | SPEED T (rpm) (1990.05 | VOLTAGE C (valts) (2.99 45 |
| *** | SIRFACE | COMPACTED SOIL | *** | DISTANCE GRADE (7.) (7.) (7.) 1000 35.3 | 30 *** | | LATERAL ACCELERATION (g's) 0.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 301863.80 | **** | | GENERATOR POWER (KW) 268.94 | BUSS CURRENT (amps) 90094.49 |
| | | | | SEGMENT NO. (#) 5 | | | TRACTIVE EFFORT (K-1bs) | | SEGMENT ENEKGY (btu) 31991.15 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 2.99 |
| | й С | DATA INPUT BY USER | | LAP NO. SI (#) | | | FORWARD VELOCITY (mph) 7.50 | B-140 | HORSEPOWER GENERATED (hp) 497.86 | | | 9E1 10 | |

李本字本

| | ELECTRIC DRIVE TYPE L | | RANGE ESTIMATE (miles) 62.72 | | NET DRIVE | EFFICIENCY (%) 61.79 | | FUEL ECONOMY (mpg) 0.36 | | | OWER) 83 | FIELD POWER (Kw) 15.0 |
|----------------------------------|---------------------------------------|----------|---|-------------|-----------------------|---|---------------|--|----------|----------------|---|---|
| | ENGINE SCHEDUL ING CONSTANT | | AVG, FORWARD VELOCITY (mph) 4.39 | | | TORQUE (ft-1b) 5611.78 | | FUEL REMAINING (gal.) 168.45 | | SPROCKET MOTOR | E HORSEPOWER b) (hp) 12 157.83 | NT FIELD (|
| | SCH | | | *** | SPROCKET | SPEED (rpm) 143.28 | ÷. | FUEL NSUMED gal.) o.528 | | OUTER SPRO | TORQUE (ft-16) 347.12 | CURRENT (amps) 37337.84 |
| | ENGINE | *** | CUMMULATIVE TIME (sec) 931.82 | 1 | OUTER SPR | HORSEPOWER (hp) 153.10 | *** | 00 | 本学卡书 | חסו | SPEED (rpm) 2388.06 | VOLTAGE (volts) 3.58 |
| | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 6000 | MANCE DATA | | TORQUE HOR((ft-1b) 5611.78 1 | RGY DATA | FUEL CONSUMPTION (1b/hr) 197.87 | VE DATA | TOR | HORSEPOWER (hp) 157.83 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | A COURSE | TIME (sec) 75.76 | PERFORMANCE | SPROCKET | SPEED (rpm) 143.28 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | IC DRIVE | SPROCKET MOTOR | TORQUE H (ft-1b) 347.12 | CURRENT (amps) 37337.84 |
| | MAX. VELOCITY (mph) 45.00 | MISSION | DE RADIUS (ft) | VEHICLE F | INNER | HORSEPOWER (hp) 153.10 | ENGINE | SEGMENT ENERGY LOSS (btu) 10140.59 | ELECTRIC | INNER | SPEED (rpm) | VOLTAGE (volts) 3.58 |
| | SURFACE COMPACTED SOIL | *** | DISTANCE GRADE (%) (%) 28.8 | **** | and the second second | LATERAL ACCELERATION (g's) 0.000 | **** | CUMMULATIVE ENERGY USED (btu) 328400.10 | *** | | GENERATOR FOWER (Kw) 267,49 | BUSS BUSS VOLTAGE CURRENT FIELD POWER VOLTAGE CURRENT FIELD POWER VOLTAGE CURRENT (KW) VOLTAGE CURRENT (KW) (KW) (volts) (amps) (amps) (KW) (volts) (amps) (amps) (KW) (volts) (Apps) (Apps) (KW) 3.58 37337.84 15.0 |
| | | | SEGMENT NO. (#) 6 | | | TRACTIVE EFFORT (K-1bs) | | SEGMENT ENERGY (btu) 26536.36 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 3.58 |
| COURSE DATA INPUT BY USER | | | LAP NO. (#) | | | FORWARD VELDCITY (mph) 9.00 | B - 14 | THORSEPOWER GENERATED (hp) 495.57 | | | | |

常常等半 ELECTRIC DRIVE PERFORMANCE 半半半半

| | ELECTRIC DRIVE TYPE HOPOI P-G | | RANGE ESTIMATE (miles) 72.81 | | NET DRIVE | EFFICIENCY (%) 62.29 | | FUEL ECONOMY (mpg) 0.42 | | | £ 101 | DWER D |
|------------|-------------------------------------|----------|---|-------------|-----------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | G. FORWARD VELOCITY (mph) 4.79 | | | TORQUE (ft-1b) 4869.35 | | FUEL REMAINING (gal.) 168.00 | | ET MOTOR | HORSEPOWER (hp) 159.78 | FIELD POWER (Kw) 15.0 |
| | l I | | ∀ | * * * * | SPROCKET | SPEED (rpm) | * | | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 301.20 | CURRENT (amps) 32158.75 |
| *** | ENGINE VTA-903 | * | CUMMULATIVE TIME (sec) 996.75 | 1 | OUTER SPR | HORSEPOWER (hp) 154.98 | * * * | 0 | *** | חם | SPEED (rpm) 2785.07 | VOLTAGE (volts) 4.18 |
| PARAMETERS | VEHICLE 19.5 TON | SE DATA | CUMMULATIVE DISTANCE (ft) 7000 | MANCE DATA | | TORQUE HOR((ft-1b) 4869.35 19 | AGY DATA | FUEL CONSUMPTION (1b/hr) 198.86 | VE DATA | 'OR | HORSEFOWER (hp) 159.78 | FIELD POWER (Kw) 15.0 |
| - 1 | MAX. LAT ACCEL. (g's) 0.50 | N COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED (rpm) 167.16 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | IC DRIVE | INNER SPROCKET MOTOR | TORGUE HC (ft-1b) 301.20 | CURRENT F (amps) 32158.75 |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | MISSION | GRADE RADIUS (%) (ft) 24 0 | VEHICLE | INNER | HORSEPOWER (hp) 154.98 | ENGINE | SEGMENT ENERGY LOSS (btu) 8613.30 | ELECTRIC | INNER | SPEED (rpm) 2786.07 | VOLTAGE (volts) 4.18 |
| *** | SURFACE COMPACTED SOIL | *** | DISTANCE GRAI (ft) (%) 1000 24 | *** | | LATERAL ACCELERATION (9's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 351240.10 | * * * | | GENERATOR FOWER (Kw) 268.79 | BUSS CURRENT (amps) 64317.49 |
| | | | SEGMENT NO. (#) | | | TRACTIVE EFFORT (K-1bs) | | SEGMENT ENERGY (btu) 22839.93 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 4.18 |
| | COURSE DATA INPUT BY USER | | LAP NO. 9 (#) | | | FORWARD VELOCITY (mph) 10.50 | B-142 | HORSEPOWER GENERATED (hp) 497.63 | | | GE 10 | |

半半半半

| | ELECTRIC DRIVE TYPE HGPO1 P-G | | RANGE ESTIMATE (miles) 83,13 | | . 0 . 4 | NEI DRIVE EFFICIENCY (%) 62.76 | | FUEL ECONOMY (mpg) 0.48 | | | wer u | D POWER (Kw) 15.0 |
|------------|-------------------------------------|---------|---|-------------|----------------|---|----------|--|---------|----------------|---|---------------------------------------|
| | ENGINE SCHEDULING | | AVG. FORWARD VELOCITY (mph) 5.18 | | | TORQUE (ft-1b) 4296.88 | | FUEL REMAINING (gal.) 167.60 | | SPROCKET MOTOR | HORSEPOWER (hp) 161.13 | FIEL |
| | SCHE | | | *** | ICKET | SPEED (rpm) 191.04 | | ED > | | R SPROCK | TORQUE (ft-1b) 265.79 | CURRENT (amps) 28166.78 |
| * * * | ENGINE | * * * * | CUMMULATIVE TIME (sec) 1053.57 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 156.30 | *** | FUEL CONSUMED (gal.) 0.399 | 本事中 | OUTER | SPEED (rpm) 3184.08 | VOLTAGE (volts) 4.78 |
| PARAMETERS | VEHICLE | E DATA | CUMMULATIVE DISTANCE (ft) BOOO | ANCE DATA | | TORQUE HORS (ft-1b) (4296.88 15 | GY DATA | FUEL CONSUMPTION (1b/hr) 199.06 | Æ DATA | H. | HORSEPOWER (hp) 161.13 | FIELD POWER. (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | COURSE | TIME (sec) 56.82 | PERFORMANCE | SPROCKET | SPEED (rpm) 191.04 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MOTOR | TORQUE HO (ft-1b) 265.79 | CURRENT F (amps) 28166.78 |
| NOISSIM | MAX. VELOGITY (mph) 45.00 | MISSIM | GRADE RADIUS (%) (ft) 20.4 0 | VEHICLE F | INNER SF | HORSEPOWER (hp) 156.30 | ENGINE | SEGMENT ENERGY LOSS (btu) 7447.89 | ELECTRI | INNER | SPEED T((rpm) (+ | VOLTAGE CI (volts) (4 4.78 28 |
| *** | SUKFACE | * * * | DISTANCE GF (ft) 1000 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * | CUMMULATIVE ENERGY USED (btu) 371242.00 | *** | | GENERATOR POWER (Kw) 269.06 | BUSS CURRENT (amps) 56333.56 |
| | | | SEGMENT NO. (#) 8 | | | TRACTIVE EFFORT (K-1bs) 9.77 | | SEGMENT ENERGY (btu) 20001.95 | | | GENERATOR SPEED (rpm) 10400.00 | RUSS VOLTAGE (volts) 4.78 |
| | COURSE DATA INPUT BY USER | | LAP NO. (#) | | | FORWARD VELOCITY (mph) 12.00 | B-143 | HORSEPOWER GENERATED (hp) 498.05 | | | <u> </u> | |

| | | *** | Σ | H | SSION PARAMETERS | RAMET | ERS | * * * | | | |
|---|---|---|----------------------------|--|--------------------------------------|--|---|---|-------------------------------|---|---------------------------------------|
| COURSE INPUT BY L | COURSE DATA INPUT BY USER | SURFACE | , | MAX. VELOCITY (mph) 45.00 | MAX. LAT. ACCEL. (g's) 0.50 | 1 ↔ | VEHICLE | ENGINE | SCHE | ENBINE SCHEDULING CONSTANT | DRIVE TYPE HOPOI P-G |
| | | * * * * | Η | NOISS | A COURSE | 1 | DATA | * * * | | | |
| Ö | SEGMENT NO. (#) 9 | DISTANCE (ft) 1000 | GRADE (%) | RADIUS (ft) O | TIME (sec) 50.51 | CUMMULATIV DISTANCE (ft) 9000 | CUMMULATIVE DISTANCE (ft) 9000 | CUMMULATIVE TIME (sec) 1104.08 | AV | AVG. FORWARD VELOCITY (mph) 5.56 | RANGE ESTIMATE (miles) 93.62 |
| | | *** | VEHI | CLE | PERFORMANCE | RMANC | E DATA | 1 | * * * | | |
| | | | | INNER | SPROCKET | | | OUTER SPROCKET | CKET | | HOTAG THIN |
| | TRACTIVE EFFORT (K-1bs) 8.74 | LATERAL ACCELERATION (g's) | HORG (| HORSEPOWER (hp) 157.30 | SPEED (rpm) 214.93 | | | HORSEPOWER (hp) 157.30 | SPEED (rpm) 214.93 | TORQUE (ft-1b) 3843.81 | EFFICIENCY (%) 63.22 |
| | | *** | ١ | ENGINE | / ENE | ENERGY | DATA | *** | | | |
| HORSEPOWER GENERATED (hp) 497.60 | SEGMENT ENERGY (btu) 17763.41 | NT CUMMULATIVE Y ENERGY USED (btu) 1 389005.40 | EN S EN | SEGMENT ENERGY LOSS (btu) 6533.06 | ENGINE SPEED (rpm) 2600.00 | | FUEL CONSUMPTION (1b/hr) | FUEL CONSUMED (gal.) 0.354 | | FUEL REMAINING (gal.) 167.24 | FUEL ECONOMY (mpg) 0.53 |
| | | * * * * | | ELECTRIC | | DRIVE D | DATA | * * * * | | | |
| | | | | INNER | INNER SPROCKET MOTOR | 10TOR | | OUTER | | SPROCKET MOTOR | |
| 104 | GENERATOR SPEED (rpm) 10400.00 | GENERATOR POWER (Kw) 268.77 | 98 7, | SPEED T (rpm) (3582.09 | TORQUE (ft-1b) 237,76 | HORSEFOWER (hp) 162.16 | ŭ lil | SPEED (rpm) 3582.09 | TORQUE (ft-1b) 237.76 | HORSEPOWER (hp) 162.16 | WER .6 |
| , , , , , , , , , , , , , , , , , , , | BUSS VOLTAGE (volts) | BUSS CURRENT (amps) 50021.52 | VOLTAGE (valts) 5.37 | | CURKENT (amps) 25010.76 | FIELD POWER (KW) 15.0 | DWER C | VOLTAGE (volts) 5.37 | CURRENT (amps) 25010.76 | | FIELD POWER (Kw) 15.0 |
| (|) | 4, 4, 4, 44 | | | | | | | | | |

| | ELECTRIC DRIVE TYPE HOPOI P-G | | RANGE ESTIMATE (miles) 104.05 | | NET DRIVE | EFFICIENCY (%) 63.69 | | FUEL ECONOMY (mpg) 0.59 | | | WER 11 | D POWER (Kw) 15.0 |
|------------|--------------------------------------|--------|--|-------------|----------------|---|----------------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING | | AVG. FORWARD VELOCITY (mph) 5.93 | | | TORQUE (ft-1b) 3483,99 | | FUEL REMAINING (gal.) 166.93 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 163.31 | H H H |
| | SCHE | | | * | CKET | SPEED (rpm) 238.81 | | ED > 9 | | R SPROCK | TORQUE (ft—1b) 215.50 | CURRENT (amps) 22503,26 |
| * * * | ENGINE | *** | CUMMULATIVE TIME (sec) 1149.53 | **** 4 | OUTER SPROCKET | HORSEPOWER (hp) 158.41 | * * * * | FUEL CONSUMED (gal.) 0.319 | 常常常 | OUTE | SPEED (rpm) 3980.10 | VOLTAGE (valts) 5.97 |
| PARAMETERS | VEHICLE | E DATA | CUMMULATIVE DISTANCE (ft) 10000 | ANCE DATA | | TORQUE HOR((ft-1b) 3483.99 19 | GY DATA | FUEL CONSUMPTION (1b/hr) 198.79 | E DATA | K | HORSEPOWER (hp) 163.31 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | COURSE | TIME (sec) 45.45 | PERFORMANCE | SPROCKET | SPEED 7 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | INNER SPROCKET MOTOR | TORQUE HOR (ft-lb) 215.50 | CURRENT F. (amps) 225503.26 |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | MISSIM | DE RADIUS (ft) | VEHICLE P | INNER SP | HORSEPOWER (hp) 158.41 | ENGINE | SEGMENT ENERGY LOSS (btu) 5804.08 | ELECTRIC | INNER | SPEED TC (rpm) (+ | VOLTAGE CL (volts) (a 5.97 228 |
| * * * | SURFACE COMPACTED SOIL | *** | DISTANCE GRADE (%) (%) (%) 15.4 | *** | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 404988.60 | *** | | GENERATOR POWER (KW) 268.70 | BUSS CURRENT (amps) 45006.52 |
| | | | SEGMENT NO. (#) 10 | | | TRACTIVE EFFORT (K-1bs) 7.92 | | SEGME'T ENERGY (btu) 15983.15 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 5.97 |
| | COURSE DATA INPUT BY USER | | LAP NG. S (#) | | | FORWARD VELOCITY (mph) 15.00 | B - 145 | HORSEPOWER GENERATED (hp) 497.48 | | | GE 10 | |

**** ELECTRIC DRIVE PERFORMANCE *

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 113.95 | | . O | EFFICIENCY (%) 64.19 | | FUEL ECONOMY (mpg) 0.65 | | | 조 도 고 | .D POWER (Kw) 15.0 | |
|------------|-------------------------------------|----------|---|---|----------------|---|--------------|--|---------|----------------------|---|---------------------------------------|---|
| | ENGINE SCHEDULING CONSTANT | | AVB. FORWARD VELOCITY (mph) 6.30 | | | TORQUE (ft-1b) 3204.36 | | FUEL REMAINING (gal.) 166.64 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 165,22 | FIEL | |
| | 800 Y | | | *** | DCKET | SPEED (rpm) 262.69 | . <u>i</u> . | L MED > | | ER SPROCK | TORQUE (ft-1b) 198.21 | CURRENT (amps) 20546.45 | |
| *** | ENGINE | * * * | CUMMULATIVE TIME (sec) 1190.85 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 160.27 | *** | FUEL CONSUMED (gal.) 0.291 | *** | TUO | SPEED (rpm) 4378.11 | VOLTAGE (valts) 6.57 | |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 11000 | MANCE DATA | | TORGUE HOR (ft-1b) 3204.36 1 | RGY DATA | FUEL CONSUMPTION (16/hr) 199.68 | VE DATA | OR | HORSEPOWER (hp) 165.22 | FIELD POWER (Kw) . | |
| | MAX. LAT ACCEL. (g's) 0.50 | A COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED (rpm) 262.69 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | CDRI | SPROCKET MOTOR | TORGUE HO (ft-1b) 198.21 | CURRENT F (amps) 20546.45 | • |
| NOISSIE | MAX. VELOCITY (mph) 45.00 | MISSION | E RADIUS (ft) 7 0 | | INNEF | HORSEPOWER (hp) 160.27 | ENGINE | SEGMENT ENERGY LOSS (btu) 5222.31 | ELECTRI | INNER | SPEED T (rpm) (4378.11 | VOLTAGE C (volts) (| |
| *** | SURFACE | *** | DISTANCE GRADE (%) (%) 13.7 | I H U N H H H H H H H H H H H H H H H H H | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 419573.00 | *** | | GENERATOR POWER (Kw) 269.86 | BUSS CURRENT (amps) 41092.89 | |
| | | | SEGMENT NO. (#) 11 | | | TRACTIVE EFFORT (K-1bs) 7.28 | | SEGMENT ENERGY (btu) 14584.39 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS · VOLTAGE (volts) | |
| | COURSE DATA INPUT BY USER | | LAP ND. (#) | | | FORWARD VELOCITY (mph) 16.50 | -146 | HORSEPOWER GENERATED (hp) 499.34 | | | | | |

本本本本

| | ELECTRIC • DRIVE TYPE | HoPol P-G | | RANGE ESTIMATE (miles) 124.40 | | . 4 | NE! DRIVE EFFICIENCY (%) 64.65 | | FUEL ECONOMY (mpg) | | | WER 1 | D POWER (Kw) 15.0 |
|------------|--------------------------|--------------------|----------|---|-------------|----------------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | I NG | CONSTANT | | AVG. FORWARD VELOCITY (mph) 6.66 | | | TORQUE (ft-1b) .2956.65 | | FUEL REMAINING (gal.) 166.37 | | SPROCKET MOTOR | HORSEPOWER (hp) 166.31 | FIELD POWER (Kw) 15.0 |
| | EN | CONSTA | | A | * * * | DCKET | SPEED (rpm) 286.57 | al. | | | ER SPROCK | TORQUE (ft-1b) 182.89 | CURRENT (amps) 18821.11 |
| *** | ENGINE | VTA-903 | ** | CUMMULATIVE TIME (sec) 1228.73 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 161.32 | * * * | FUEL CONSUMED (gal.) 0.266 | *** | OUTER | SPEED (rpm) 4776.12 | VOLTAGE (volts) 7.16 |
| FARAMETERS | VEHICLE | 19.5 TON | E DATA | CUMMULATIVE DISTANCE (ft) 12000 | ANCE DATA | | TORQUE HOR((ft-1b) 2956.65 10 | ву вата | FUEL CONSUMPTION (16/hr) 199.54 | E DATA | œ | HORSEPOWER (hp) 166.31 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT. | (d,e) 0.50 | A COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED T((rpm) (- | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | INNER SPROCKET MOTOR | TORQUE HOR((tt-1b) | CURRENT FIE (amps) 18821.11 |
| NOISSIM | MAX. VELOCITY | (mph) 45.00 | MISSION | GRADE RADIUS (%) (ft) 12.2 0 | VEHICLE | INNER S | HORSEPOWER (hp) 161.32 | ENGINE | SEGMENT ENERGY LOSS (btu) 4722.66 | ELECTRIC | INNER | SPEED T (rpm) (4776.12 | VOLTAGE C (volts) (7.16 18 |
| *** | SURFACE | COMPACTED SOIL | * * * | DISTANCE GRADE (ft) (%) 1000 12.3 | 3> ** ** | | LATERAL ACCELERATION (g's) 0.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 432934.00 | * * * | | BENEKATUR POWER (Kw) 259.68 | BUSS CURRENT (amps) 37642.21 |
| | | | | SEGMENT NO. (#) 12 | | | TRACTIVE EFFORT (K-1bs) 6.72 | | SEGMENT ENERGY (btu) 13361.01 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 7,16 |
| | COURSE | DATA INPUT BY USER | | LAP NO. S (#) | | | FORWARD VELOCITY (mph) 18.00 | -147 | HORSEPOWER GENERATED (hp) 499.04 | | ١. | | |

**** ELECTRIC DRIVE PERFORMANCE *

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 135.03 | | NET DRIVE | EFFICIENCY (%) 64.65 | | FUEL ECONOMY (mpg) 0.77 | | | DWER 34 | FIELD POWER (Kw) |
|------------|-------------------------------------|---------|---|-------------|-----------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | AVB. FORWARD VELOCITY (mph) 7.02 | | | TORQUE (ft-1b) 2724.73 | | FUEL REMAINING (gal.) 166.12 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 166.04 | |
| | HOS | | | ** | SPROCKET | SPEED (rpm) 310.45 | ılı. | L MED . > 45 | | ER SPROC | TORQUE (ft-1b) 168,54 | CURRENT (amps) 17340.28 |
| *** | ENGINE VIA-903 | * * * | CUMMULATIVE TIME (sec) 1263.70 | ** ATA0 | OUTER SPR | HORSEPOWER (hp) 161.06 | *** | FUEL CONSUMED (gal.) 0.245 | * * * * | TUO | SPEED (rpm) 5174.13 | VOLTAGE (volts) 7.76 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 13000 | | | TORQUE HOR (ft-1b) 2724.73 1 | RGY DATA | FUEL. CONSUMPTION (1b/hr) 199.15 | VE DATA | MOTOR | HORSEFOWER (hp) 166.04 | FIELD POWER (Kw) 15.0 |
| İ | MAX. LAT ACCEL. (g's) 0.50 | COURSE | TIME (sec) 34.97 | PERFORMANCE | SPROCKET | SPEED (rpm) 310.45 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MO | TORQUE H(ft-1b) | CURRENT (amps) |
| MISSIM | MAX. VELOCITY (mph) 45.00 | MISSION | RADE RADIUS (%) (ft) 10.8 0 | VEHICLE | INNER S | HORSEPOWER (hp) 161.06 | ENG INE | SEGMENT ENERGY LOSS (btu) 4352.32 | ELECTRIC | INNER | SPEED T (rpm) (| VOLTAGE C (volts) (|
| *** | SURFACE COMPACTED SOIL | *** | DISTANCE GRADE (7.) (%) 10.8 | *** | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 445247.10 | *** | | GENERATOR POWER (Kw) 269.16 | RUSS CURRENT (amps) 34680.55 |
| | | | SEGMENT NO. (#) 13 | | | TRACTIVE EFFORT (K-1bs) 6.19 | | SEGMENT ENERGY (btu) 12313.03 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 7.76 |
| | COURSE DATA INPUT BY USER | | LAP NO. S (#) | | | FORWARD VELGCITY (mph) | 148 | HORSEPOWER GENERATED (hp) 498,22 | | | GE 10 | |

| | ELECTRIC 'DRIVE TYPE | HoPol P-G | | RANGE ESTIMATE (miles) 145.26 | | HOTAG FAN | EFFICIENCY (%) 64.66 | | FUEL ECONOMY (mpg) 0.83 | | | ower) 21 | FIELD POWER (Kw) 15.0 |
|------------|-------------------------|--------------------|---------|---|-------------|----------------|---|----------|--|----------|----------------|---|--|
| | ENGINE SCHEDULING | CONSTANT | | AVG. FORWARD VELOCITY (mph) 7.37 | | | TORQUE (ft-1b) 2532.67 | | FUEL REMAINING (gal.) 165.90 | | SPROCKET MOTOR | HORSEPOWER (hp) 5 166.21 | |
| | EN | NO D | | | ** | DKET | SPEED (rpm) 334.33 | | ED 9 | | R SPROCK | TORQUE (ft-1b) 156.66 | CURRENT (amps) 16117,99 |
| *** | ENGINE | VTA-903 | *** | CUMMULATIVE TIME (sec) 1296.16 | **** 41 | OUTER SPROCKET | HORSEPOWER (hp) 161.22 | * * * | FUEL CONSUMED (gal.) 0.228 | *** | OUTER | SPEED (rpm) 5572.14 | VOLTAGE (valts) 8.36 |
| PARAMETERS | VEHICLE | 19.5 TON | E DATA | CUMMULATIVE DISTANCE (ft) 14000 | ANCE DATA | | TORQUE HORS (ft-1b) 2532.67 10 | бү рата | FUEL CONSUMPTION (1b/hr) 199.35 | E DATA | π | HORSEPOWER (hp) 166.21 | FIELD POWER (Kw) |
| | MAX. LAT. | (5,6) 0°20 | COURSE | TIME (sec) 32.47 | PERFORMANCE | SPROCKET | SPEED T (rpm) (334.33 2 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MOTOR | TORQUE HOR (ft-1b) | CURRENT FI (amps) 16117.99 |
| MISSIM | MAX. VELOCITY | (mph) 45.00 | NOISSIM | GRADE RADIUS (%) (ft) 9.640001 0 | VEHICLE | INNER | HORSEFOWER (hp) 161.22 | ENGINE | SEGMENT ENERGY LOSS (btu) 4043.90 | ELECTRIC | INNER | SPEED 1 (rpm) (5572.14 | . VOLTAGE (VOLTAS) (VOLTS) (VOLTAS) (VO |
| *** | SURFACE | CJMPACTED SOIL | * * * | DISTANCE 6F((ft) (7 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * | CUMMULATIVE ENERGY USED (btu) 456890.60 | *** | | GENERATOR POWER (KW) 269.44 | BUSS CURRENT (amps) 32235.98 |
| | | | | SEGMENT ND. (#) 14 | | | TRACTIVE EFFORT (K-1bs) 5.76 | | SEGMENT ENERGY (btu) 11443.52 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 8.36 |
| | E SE | DATA INPUT BY USER | | LAP NO. (#) | | | FORWARD VELOCITY (mph) 21.00 | B-149 | HORSEPOWER GENERATED (hp) 498.65 | | | O 1 | |

ELECTRIC DRIVE PERFORMANCE ***

| | ELECTRIC DRIVE TYPE HaPal P-G | | RANGE ESTIMATE (miles) . 155.86 | | NET DRIVE | EFFICIENCY (%) 64.65 | | FUEL ECONOMY (mpg) 0.89 | | | 1WER 18 | FIELD POWER (Kw) 15.0 |
|------------|-------------------------------------|---------|--|-------------|-----------|---|----------------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING | | G. FORWARD VELOCITY (mph) 7.71 | | | TORQUE (ft-1b) 2360.61 | | FUEL REMAINING (gal.) 165.68 | | ET MOTOR | HORSEPOWER (hp) 165.98 | |
| | SCHE | | VE AVG. | * * * | SPROCKET | SPEED (rpm) 358.21 | ů. | L MED 13 | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 146.02 | CURRENT (amps) 15023.01 |
| *** | ENGINE | *** | CUMMULATIVE TIME (sec) 1326.47 | 1 | OUTER SPR | HORSEPOWER (hp) 161.00 | * * * | FUEL CONSUMED (gal.) | * * * * | TUD | SPEED (rpm) 5970.15 | VOLTAGE (volts) 8.96 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 15000 | MANCE DATA | | TORQUE HOR((ft-1b) 2360.61 14 | AGY DATA | FUEL CONSUMPTION (1b/hr) 199.07 | JE DATA | OR | HORSEFOWER (hp) 165.98 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED (rpm) 358.21 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MOTOR | TORGUE HC (ft-1b) | CURRENT (amps) |
| MISSION | MAX. VELOCITY (mph) 45.00 | MISSION | GRADE RADIUS (%) (ft) B.600001 0 | VEHICLE | INNER | HORSEPOWER (hp) 161.00 | ENGINE | SEGMENT ENERGY LOSS (btu) 3771.22 | ELECTRIC | INNER | SPEED 1 (rpm) (5970.15 | VOL.TAGE C (volts) (8.96 15 |
| * * * | SURFACE | *** | DISTANCE G (ft) 1000 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * | CUMMULATIVE ENERGY USED (btu) 467358.80 | * * * | | GENERATOR POWER (KW) | BUSS CURRENT (amps) 30046.01 |
| | | | SEGMENT NO. (#) 15 | | | TRACTIVE EFFORT (K-1bs) 5.37 | | SEGMENT ENERGY (btu) 10668.15 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 8.94 |
| | COURSE DATA INPUT BY USER | | LAP NO. (#) | | | FORWARD VELDCITY (mph) 22.50 | B - 150 | HORSEPOWER GENERATED (hp) 498.07 | | | 9 Y | |

| | ELECTRIC DRIVE TYPE HOPOl P-G | | RANGE ESTIMATE (miles) 165.79 | | | NE! DRIVE EFFICIENCY (%) 64.67 | | FUEL ECONOMY (mpg) 0.95 | | | VER 20 | OWER O |
|------------|--------------------------------------|---------|--|-------------|------------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | AVG. FORWARD VELOCITY (mph) 8.06 | | | TORQUE (ft-1b) 2218.99 | | FUEL REMAINING (gal.) 165.48 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 166.42 | FIELD POWER (Kw) 15.0 |
| | SCHE | | | * * * | SPROCKET | SPEED (rpm) 382.09 | , | TED 00 | | ER SPROCK | TORQUE (ft-1b) 137.26 | CURRENT (amps) 14121.70 |
| *** | ENGINE | * * * | CUMMULATIVE TIME (sec) 1354.88 | | OUTER SPRO | . HORSEPOWER (hp) 161.43 | * * * | FUEL CONSUMED (gal.) | * * * * | OUTE | SPEED (rpm) 6368.16 | VOLTAGE (volts) 9.55 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 16000 | ANCE DATA | | TORQUE · HOR (ft-1b) 2218.99 1 | GY DATA | FUEL CONSUMPTION (1b/hr) 199.62 | E DATA | æ | HORSEFOWER (hp) 166.42 | FIELD FOWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | COURSE | TIME (sec) 28.41 | PERFORMANCE | SPROCKET | SPEED (rpm) 382.09 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | CDRIVE | SPROCKET MOTOR | TORQUE HOF (ft-1b) | CURRENT FI (amps) 14121.70 |
| MISSION | MAX. VELOCITY (mph) 45.00 | NOISSIM | GRADE RADIUS (%) (ft) 7.74 0 | VEHICLE F | INNER | HORSEPOWER (hp) 161.43 | ENGINE | SEGMENT ENERGY LOSS (btu) 3541.20 | ELECTRIC | INNER | SPEED T((rpm) (+ | VOLTAGE CU (volts) (4 9.55 14: |
| *** | SURFACE | *** | DISTANCE GF (ft) (1000 7 | *** | | LAIERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 477383.10 | * * * * | | GENERALUK POWER (KW) . 269.79 | BUSS CURRENT (amps) 28243.41 |
| | | | SEGMENT ND. (#) | | ! | TRACTIVE EFFORT (K-1bs) 5.04 | | SEGMENT ENERGY (btu) 10024.34 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 9.55 |
| | COURSE DATA INPUT BY USER | | LAP NG. (#) | | | FORWARD VELOCITY (mph) 24.00 | -151 | HORSEPOWER GENERATED (hp) 499.21 | | | 6F 10 | · |

| | ELECTRIC DRIVE TYPE HaPol P-G | | RANGE ESTIMATE (miles) 176.08 | | NET DRIVE | EFFICIENCY (%) 64.68 | | FUEL ECONOMY (mpg) 1.01 | | | JWER 19 | D POWER (KW) 15.0 |
|------------|-------------------------------------|---------|---|-------------|----------------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENBINE SCHEDULING CONSTANT | | AVB, FORWARD VELOCITY (mph) 8.39 | | | TORQUE (ft-1b) 2089,29 | | FUEL REMAINING (gal.) 165.29 | | ET MOTOR | HORSEPOWER (hp) 166.49 | F 1818 |
| | SCHE | | A | * * * | CKET | SPEED (rpm) 405.97 | A. | | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 129.23 | CURRENT (amps) 13296.29 |
| *** | ENGINE | *** | CUMMULATIVE TIME (sec) 1381.61 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 161.49 | * * * * | FUEL CONSUMED (gal.) | * * * * | OUTE | SPEED (rpm) 6766.17 | VOLTAGE (volts) 10.15 |
| PARAMETERS | VEHICLE 19.5 TON | SE DATA | CUMMULATIVE DISTANCE (ft) 17000 | ANCE DATA | | TORGUE HOR((ft-1b) 2089.29 10 | SGY DATA | FUEL CONSUMPTION (1b/hr) 199.70 | JE DATA | OR | HORSEPOWER (hp) 166.49 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | COURSE | TIME (car) | PERFORMANCE | SPROCKET | SPEED (rpm) 405.97 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MOTOR | TORGUE HO (ft-1b) 129.23 | CURRENT F (amps) |
| MISSION | MAX. VELOCITY (mph) 45.00 | MISSION | GRADE RADIUS (%) (++) | VEHICLE F | INNER S | HORSEPOWER (hp) | ENGINE | SEGMENT ENERGY LOSS (btu) 3333.69 | ELECTRIC | INNER | SPEED T (rpm) (6765.17 | VOLTAGE C (volts) (|
| *** | SURFACE COMPACTED SOIL | * * * * | DISTANCE GR (f+) ('1000 6 | > *** | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 486821.00 | *** | | GENERATOR FOWER (Kw) 269.89 | BUSS CURRENT (amps) 26592.58 |
| | | | SEGMENT ND. (#) | | | TRACTIVE EFFORT (K-1bs) | | SEGMENT ENERGY (btu) 9437.89 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 10.15 |
| | COURSE DATA INPUT BY USER | | LAP NO. (#) | | | FORWARD VELOCITY (mph) | -152 | HORSEPOWER GENERATED (hp) 499.38 | | | 9 01 | |

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) | | | NET DRIVE EFFICIENCY (%) 64.69 | | FUEL ECONOMY (mpg) 1.06 | | | | E E |
|------------|--------------------------------------|---------|--|---|----------------|---|----------|--|----------|-------------------|---|---|
| | ENGINE SCHEDULING D | | G. FORWARD VELOCITY (mph) 8.73 | | | TORQUE (ft-1b) 1975.01 | | FUEL REMAINING (gal.) 165.12 | | T MOTOR | HORSEPOWER (hp) 166.64 | FIELD POWER (KW) 15.0 |
| | SCHE | | Ą | ** | DCKET | SPEED (rpm) 429.85 | | | | ER SPROCKET MOTOR | TORQUE (ft-1b) 122.17 | CURRENT (amps) 12569.02 |
| *** | ENGINE | ** | CUMMULATIVE TIME (sec) 1406.87 | ** PT W T W T W T W T W T W T W T W T W T | OHTER SPROCKET | HORSEPOWER (hp) 161.64 | * * * * | FUEL CONSUMED (gal.) | *** | DUTER | SPEED (rpm) 7164.18 | VOLTAGE (volts) 10.75 |
| PARAMETERS | T. VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 18000 | i | | TORGUE HOR (+t-1b) 1975.01 | RGY DATA | FUEL CONSUMPTION (1b/hr) 199.89 | /E DATA | OR | HORSEPOWER (hp) 166.64 | FIELD POWER (Kw) |
| | MAX. LAT. ACCEL. (g's) 0.50 | COURSE | TIME (sec) 25.25 | PERFORMANCE | SPROCKET | SPEED (rpm) 429.85 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MOTOR | TORQUE HO (ft-1b) | CURKENT F (amps) 12569.02 |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | MISSION | GRADE RADIUS (%) (+t) 6.25 0 | VEHICLE P | INNER SF | | ENGINE | SEGMENT ENERGY LOSS (btu) 3150.21 | ELECTRIC | INNERS | SPEED TO (frpm) | VOLTAGE CUI (volts) (am 10.75 125 |
| * * * | 'SURFACE | * * * | DISTANCE GF (ft) (1000 6 | > * * * * | | LATERAL ACCELERATION (g's) 0.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 495741.60 | * * * | GCTYCOCK | POWER (KW) 270.14 | BUSS CURRENT (amps) 25138.04 |
| | | | SEGMENT NJ. (#) 18 | | | TRACTIVE EFFORT (K-1bs) 4.49 | | SEGMENT ENERGY (btu) 8920.53 | | GENEDATOR | SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 10.75 |
| | COURSE DATA INPUT BY USER | | LAP NO. 8 (#) | | | FORWARD VELOCITY (mph) 27.00 | 3-153 | HORSEFOWER GENERATED (hp) 499.77 | | ບໍ່ | ,01 | |
| | | | | | | | - 100 | | | | | |

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 196.79 | | NET DRIVE | EFFICIENCY (%) 64.68 | | FUEL ECONOMY (mpg) 1.12 | | | JWER 19 | D POWER (Kw) |
|------------|-------------------------------------|----------|---|-------------|----------------|---|----------|--|----------|----------------|---|---------------------------------------|
| | ENGINE SCHEDULING | | AVG. FORWARD VELOCITY (mph) 9.06 | | | TORQUE (ft-1b) 1869.40 | | FUEL REMAINING (gal.) 164.95 | | SPROCKET MOTOR | HORSEFOWER (hp) 166.49 | FIEL |
| | SCHI | | | * * * | CKET | SPEED (rpm) 453.73 | t. | 4ED > 58 | | ER SPROCH | TORQUE (ft-1b) 115.63 | CURRENT (amps) 11896.94 |
| * | ENGINE VTA-903 | ** | CUMMULATIVE TIME (sec) 1430.79 | DATA ** | OUTER SPROCKET | HORSEPOWER (hp) 161.50 | * * * * | FUEL CONSUMED (gal.) 0.168 | 本本本 | OUTER | SPEED (rpm) 7562.19 | VOLTAGE (volts) 11.34 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 19000 | 1 | | TORQUE HOR (+t-1b) 1869.40 1 | ATAU YBA | FUEL CONSUMPTION (1b/hr) 199.71 | JE DATA | OR | HORSEPOWER (hp) 166.49 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | A COURSE | TIME (sec) 23.92 | PERFORMANCE | SPROCKET | SPEED (rpm) 453.73 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | IC DRIVE | SPROCKET MOTOR | TORGUE HC (+t-1b) | CURRENT F (amps) 11896.94 |
| MISSION | MAX. VELOCITY (mph) 45.00 | MISSION | DE RADIUS) (ft) 6 0 | VEHICLE | INNER | HORSEPOWER (hp) 161.50 | ENGINE | SEGMENT ENERGY LOSS (btu) 2982.82 | ELECTRIC | INNER | SPEED (rpm) 7562.19 | VOLTAGE (volts) |
| *** | SURFACE COMPACTED SOIL | *** | DISTANCE GRADE (ft) (%) 1000 5.6 | *** | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 504186.20 | *** | | GENERATOR POWER (Kw) 269.90 · | BUSS CURRENT (amps) 23793.88 |
| | | | SEGMENT NO. (#) 19 | | | TRACTIVE EFFORT (K-1bs) 4.25 | | SEGMENT ENERGY (btu) 8444.59 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 11.34 |
| | COURSE DATA INPUT BY USER | | LAP NO. (#) | | | FORWARD VELOCITY (mph) 28.50 | .54 | HORSEPOWER GENERATED (hp) 499.39 | | | GE 01 | |

**** ELECTRIC DRIVE PERFORMANCE

| COURSE DATA INPUT BY | E BY USER | SURFACE COMPACTED SOIL | > \ | MAX. VELOCITY (mph) 45.00 | MAX. LAT ACCEL. (g's) 0.50 | VEHICLE | ON | ENGINE | ENGINE SCHEDULING | ı | ELECTRIC DRIVE TYPE |
|---|---|--|-----------------------------|--|-------------------------------------|--|------------------------------|---|-------------------------------|---|--|
| | | *** | Σ I | SSION | COURSE | SE DATA | 1 | *** | | | |
| LAF ND. (#) 1 | SEGMENT NG. (#) 20 |). DISTANCE (ft) 1000 | GRADE (%) 5 | RADIUS (ft) O | TIME (sec) 22.73 | CUMMULATIVE DISTANCE (ft) 20000 | | CUMMULATIVE TIME (sec) 1453.52 | AVG. VEI | G. FORWARD VELOCITY (mph) 9.39 | RANGE ESTIMATE (miles) 207.56 |
| | | *** | VEHIC | | ERFOR | PERFORMANCE | DATA | * * * | * | | |
| | | | | INNER SPE | SPROCKET | | U | OUTER SPROCKET | Ή | | HOT AG THIS |
| FORWARD VELOCITY (mph) | TRACTIVE EFFORT (K-1bs) | LATERAL ACCELERATION (g's) 0.000 | HORSEF (hp 161. | HORSEFOWER (hp) 161.19 | SPEED (rpm) 477.61 | TORQUE (ft-1b) 1772.51 | HORSEPOWER (hp) 161.19 | | SPEED (rpm) 477.61 | TORQUE (ft-1b) 1772.51 | EFFICIENCY (%) 64.66 |
| -155 | | *** | F E NG | H N H | | ENERGY DA | DATA | *** | | | |
| HORSEPOWER GENERATED (hp) 498.57 | R SEGMENT ENERGY (btu) 8009.08 | ENT CUMMULATIVE 3Y ENERGY USED 0 (btu) 08 512195,20 | | SEGMENT ENERGY LOSS (btu) 2830.39 | ENGINE SPEED (rpm) 2600.00 | E FUEL CONSUMPTION (1b/hr) 199.31 | 1 71 31 | FUEL CONSUMED (gal.) 0.160 | | FUEL REMAINING (gal.) 164,79 | FUEL ECONOMY (mpg) 1.19 |
| | | *** | A I | ECTRIC | C DRIVE | VE DATA | 1 | *** | | | |
| | · | | | INNER S | SPROCKET MOTOR | JTOR | | OUTER | OUTER SPROCKET MOTOR | MOTOR | |
| | GENERATOR SPEED (rpm) 10400.00 | GENERATOR POWER (KW) 269.38 | SPEE (rpm 7960. | 20 (2 | TORQUE + (+t-1b) 109.64 | HORSEFOWER (hp) 166.17 | · | SPEED 7960.20 | TORQUE (ft-1b) 109.64 | HORSEPOWER (hp) 166.17 | WER 7 |
| | BUSS VOLTAGE (volts) 11.94 | BUSS CURRENT (amps) 22560.66 | VOLTAGE (volts) 11.94 | | CURRENT (amps) 11280.33 | FIELD POWER (KW) 15.0 | | VOLTAGE ((volts) | CURRENT (amps) 11280.33 | FIELD POWER (Kw) 15.0 | D POWER (Kw) 15.0 |

| | ELECTRIC DRIVE TYPE HOPOI P-G | | RANGE ESTIMATE (miles) 217.30 | | HEV DRIVE | EFFICIENCY (%) 64.69 | | FUEL ECONOMY (mpg) 1.24 | | | N MER | POWER A) |
|------------|--------------------------------------|----------|--|-------------|-----------|---|----------|--|---------------------------------------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | G. FORWARD VELOCITY (mph) 9.71 | | | TORQUE (ft-1b) 1692.92 | | FUEL REMAINING (gal.) 164.64 | | T MOTOR | HORSEPOWER (hp) 166.65 | FIELD POWER (Kw) 15.0 |
| | SCHEI | | Ą | *** | SPROCKET | SPEED (rpm) 501.49 | ₩ | | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 104.72 | CURRENT (amps) 10773.84 |
| * * * | ENGINE | * * * | CUMMULATIVE TIME (sec) 1475.16 | 1 | OUTER SPR | HORSEPOWER (hp) 161.65 | ** | FUEL CONSUMED (gal.) 0.153 | · · · · · · · · · · · · · · · · · · · | נחם | SPEED (rpm) 8358.22 | VOLTAGE (volts) 12.54 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 21000 | ANCE DATA | | TORQUE HORS (ft-1b) (1692.92 14 | KGY DATA | FUEL CONSUMPTION (16/hr) 199,90 | JE DATA | OR | HORSEPOWER (hp) 166.65 | FIELD POWER (Kw) 15.0 |
| | MAX, LAT, ACCEL. (g's) 0.50 | A COURSE | TIME (sec) 21.64 | PERFORMANCE | SPROCKET | SPEED (rpm) 501.49 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | INNER SPROCKET MOTOR | TORQUE HO (ft-1b) | CURRENT F (amps) |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | NOISSIM | GRADE RADIUS (%) (ft) 4.5 0 | VEHICLE | INNERS | HORSEPOWER (hp) 161.65 | ENGINE | SEGMENT ENERGY LOSS (btu) 2700.24 | ELECTRIC | INNER | SPEED T (rpm) (8358.22 | VOLTAGE C (volts) (12.54 10 |
| * * * * | SURFACE COMPACTED SOIL | * * * * | DISTANCE GR(ft) (7 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * * | CUMMULATIVĖ ENERGY USED (btu) 519841.70 | *** | | GENERATOR POWER (Kw) 270.15 | BUSS CURRENT (amps) 21547.67 |
| | | | SEGMENT NO. (#) 21 | | | TRACTIVE EFFORT (K-1bs) 3.85 | | SEGMENT ENERGY (btu) 7646.40 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 12.54 |
| | COURSE DATA INPUT BY USER | | LAF NO. S (#) | , | | FORWARD VELOCITY (mph) 8 31.50 | 156 | HORSEPOWER GENERATED (hp) 499.79 | | | 96 10 | |

京本本本本本

本常常本

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 228.00 | | NET DRIVE | EFFICIENCY (%) 64.67 | | FUEL ECONOMY (mpg) | | | DWER) 40 | FIELD POWER (Kw) 15.0 |
|------------|--------------------------------------|---------|--|-------------|----------------|-------------------------------------|--------------|--|----------|----------------|---|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | AVG. FORWARD VELOCITY (mph) 10.03 | | ٠ | TORQUE (ft-1b) 1613.57 | | FUEL REMAINING (gal.) 164.49 | | SPROCKET MOTOR | E HORSEPOWER (hp) 31 166.40 | |
| | 900 H | | | *** | OCKET | SPEED (rpm) 525.37 | d. | ر ۱۳ مر ۲۶ م | | ER SPROC | TORQUE (ft-1b) 99.81 | CURRENT (amps) 10268.82 |
| * * * * | ENGINE VTA-903 | 京本本 | CUMMULATIVE TIME (sec) 1495.82 | 1 | OUTER SPROCKET | HÔRSEPOWER (hp) 161.41 | ** * * | FUEL CONSUMED (gal.) | * * * | OUTER | SPEED (rpm) 8756.23 | VOLTAGE (volts) 13.13 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 22000 | ANCE DATA | | TORQUE HÔR((ft-1b) 1613.57 1 | REY DATA | FUEL CONSUMPTION (1b/hr) 199.59 | VE DATA | TOR | HORSEPOWER (hp) 166.40 | FIELD POWER (Kw) |
| | MAX. LAT. ACCEL. (g's) 0.50 | COURSE | TIME (sec) 20.66 | PERFORMANCE | SPROCKET | SPEED (rpm) 525.37 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | IC DRIVE | SPROCKET MOTOR | TORQUE H((ft-1b) 99.81 | CURRENT (amps) 10268.82 |
| NOISSIE | MAX. VELOCITY (mph) 45.00 | NOISSIM | E RADIUS (+t) | | INNER | HORSEPOWER (hp) 161.41 | ENGINE | SEGMENT ENERGY LOSS (btu) 2575.19 | ELECTRIC | INNER | SPEED (rpm) 8756.23 | VOLTAGE (volts) 13.13 1 |
| **** | SURFACE . COMPACTED SOIL | *** | DISTANCE GRADE (%) (%) (%) | **** VEHI | | LATERAL ACCELERATION (g's) 0.000 | **** | CUMMULATIVE ENERGY USED (btu) 527131.10 | *** | | GENERATOR FOWER (Kw) 269,75 | BUSS CURRENT (amps) 20537.63 |
| | | | SEGMENT NO. (#) 22 | | | TRACTIVE EFFORT (K-1bs) | | SEGMENT ENERGY (btu) 7289.51 | | • | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 13.13 |
| | COURSE DATA INPUT BY USER | | LAP NO. SI (#) | | | FORWARD VELOCITY (mph) | B-15 | HORSEPOWER GENERATED (hp) 499.15 | | | 96 | |

宋本本等 ELECTRIC DRIVE PERFORMANCE 本本本本

| | ELECTRIC DRIVE TYPE HOPOl P-G | | RANGE ESTIMATE (miles) 238.15 | | NET DRIVE | EFFICIENCY (%) 64.68 | | FUEL ECONOMY (mpg) 1.36 | | | WER 4 | (Kω) 15.0 |
|------------|--------------------------------------|---------|--|-------------|-----------|---|----------|--|-----------|----------------|---|---------------------------------------|
| | ENGINE SCHEDULING | | G. FORWARD VELOCITY (mph) 10.35 | | | TORQUE (ft-1b) 1544.73 | | FUEL REMAINING (gal.) 164.35 | | SPROCKET MOTOR | HORSEPOWER (hp) 166.54 | FIELD POWER (KW) 15.0 |
| | SCHEI | | Ą | * * * * | SPROCKET | SPEED (rpm) 549.25 | ن | | | OUTER SPROCKE | TORQUE (ft-1b) 95.55 | CURRENT (amps) 9830.71 |
| * * * | ENGINE VTA-903 | *** | CUMMULATIVE TIME (sec) 1515.59 | 1 | OUTER SPR | HORSEPOWER (hp) 161.54 | *** | FUEL CONSUMED (gal.) 0.139 | * * * * | TUO | SPEED '(rpm) | VOLTAGE (volts) 13.73 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 23000 | TANCE DATA | | TORQUE HORS (ft-1b) (1544.73 16 | SGY DATA | FUEL CONSUMPTION (16/hr) 199.77 | ZE DATA | OR | HORSEPOWER (hp) 166.54 | FIELD POWER (KW) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | COURSE | TIME (sec) 19.76 | PERFORMANCE | SPROCKET | SPEED (rpm) 549.25 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MOTOR | TORGUE HO (ft-1b) 95.55 | CURRENT F (amps) |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | NOISSIM | F RADIUS (ft) is 0 | ICLE | INNER S | HORSEPOWER (hp) 161.54 | ENGINE | SEGMENT ENERGY LOSS (btu) 2464.48 | ELECTRIC | INNER | SPEED T (rpm) (9154.25 | VOLTAGE C (valts) (|
| *** | SURFACE | *** | DISTANCE GRADE (%) (%) 1000 3.55 | 工山> **** | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 534108.80 | · * * * * | | GENERATOR POWER (Kw) 269.98 | BUSS CURRENT (amps) 19661.41 |
| | | | SEGMENT NO. (#) 23 | | | TRACTIVE EFFORT (K-lbs) 3.51 | | SEGMENT ENERGY (btu) 6977.67 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 13.73 |
| | COURSE DATA INPUT BY USER | | LAP NO. Si (#) | | | FORWARD VELOCITY (mph) | 158 | HORSEPOWER GENERATED (hp) 499,52 | | | 9E 10 | |

**** ELECTRIC DRIVE PERFORMANCE

常本本本

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 248.35 | | | NEI DKIVE EFFICIENCY (%) 64.69 | | FUEL ECONOMY (mpg) 1.42 | | | WER 4 | D FOWER (Kw) 15.0 |
|------------|-------------------------------------|---------|--|-------------|----------------|---|-----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | AVG. FORWARD VELOCITY (mph) | | | TORQUE (ft-1b) 1481.28 | | FUEL REMAINING (gal.) 164.22 | | SPROCKET MOTOR | HORSEPOWER (hp) 166.64 | F IEL |
| | SCHE | | | *** | CKET | SPEED (rpm) 573.14 | | α → Ε. | | R SPROCK | TORQUE (ft-1b) 91.63 | CURRENT (amps) 9426.91 |
| 本字字字 | ENGINE | *** | CUMMULATIVE TIME (sec) ' | 1 | OUTER SPROCKET | HORSEPOWER (hp) 161.64 | * * * * * | FUEL CONSUMED (gal.) 0.133 | *** | OUTER | speeD (rpm) 9552.26 | VOLTAGE (volts) 14.33 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 24000 | MANCE DATA | | TORQUE HOR: (ft-1b) 1481.28 10 | RGY DATA | FUEL CONSUMPTION (1b/hr) 199.90 | VE DATA | TOR | HORSEFOWER (hp) 166.64 | FIELD FOWER (Kw) 15.0 |
| 1 | MAX. LAT ACCEL. (g's) 0.50 | COURSE | TIME (sec) 18.94 | PERFORMANCE | SPROCKET | SPEED (rpm) 573.14 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | INNER SPROCKET MOTOR | TORQUE H (ft-1b) 91.63 | CURRENT (amps) 9426.91 |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | MISSIM | RADE RADIUS (%) (ft) 3.15 0 | ICLE | INNER | HORSEPOWER (hp) 161.64 | ENGINE | SEGMENT ENERGY LOSS (btu) 2362.68 | ELECTRIC | INNER | SPEED T (rpm) (9552.26 | VOLTAGE C (volts) (|
| * * * | SURFACE | *** | DISTANCE GRADE (ft) (%) 1000 3.15 | 工山 **** | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 540799.30 | ** | | GENERATOR POWER (Kw) 270.14 | BUSS CURRENT (amps) 18853.83 |
| | | | SEGMENT NO. (#) 24 | | | TRACTIVE EFFORT (K-1bs) 3.37 | | SEGMENT ENERGY (btu) 6690.49 | | • | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 14.33 |
| | COURSE DATA INPUT BY USER | | LAP NO. 6 (#) | | | FORWARD VELOCITY (mph) 36.00 | B-159 | HORSEPOWER BENERATED (hp) 499,78 | | | . OE | |

| | | * * * | I | NOISSIM | | FARAMETERS | *** | | L 44 F C 24 F C | n in the state of |
|---|---|--|-----------------------------|--|--------------------------------------|--|---|-------------------------------------|---|---|
| COURSE DATA INPUT BY USER CO | ñ | SURFACE | , | MAX. VELOCITY (mph) 45.00 | MAX. LAT. ACCEL. (g's) 0.50 | VEHICLE | E ENGINE | 1 | ENGINE SCHEDULING CONSTANT | DRIVE TYPE HOPOI P-6 |
| | | *** | Σ | SSION | A COURSE | SE DATA | *** | di. | | |
| SEGMENT NO. (#) 25 | | DISTANCE (ft) | GRADE (%) 2.75 | RADIUS (ft) O | TIME (sec) 18.18 | CUMMULATIVE DISTANCE (ft) 25000 | CUMMULATIVE TIME (sec) 1552.71 | | AVG. FORWARD VELOCITY (mph) 10.98 | RANGE ESTIMATE (miles) 259.12 |
| | | *** | VEHI | | PERFORMANCE | | DATA * | *** | | |
| | | | | INNER S | SPROCKET | | OUTER SPROCKET | PROCKET | | |
| TRACTIVE EFFORT (K-1bs) | | LATERAL ACCELERATION (g's) 0.000 | HORS . 16 | HORSEPOWER (hp) 161.39 | SPEED (rpm) 597.02 | TORQUE (ft-1b) 1419.81 | HORSEPOWER (hp) 161.39 | SPEED (rpm) 597.02 | TORQUE (4t-1b) | NEI DRIVE EFFICIENCY (%) 64.67 |
| | | 本本字字 | Z 山 | ENGINE | / ENE | ENERGY DATA | *** | * - | | |
| SEGMENT ENERGY (btu) 6414.24 | | CUMMULATIVE ENERGY USED (btu) 547213.60 | ENE S | SEGMENT ENERGY LOSS (btu) 2266.04 | ENGINE SPEED (rpm) 2600.00 | FUEL CONSUMPTION (1b/hr) 199.57 | | FUEL CONSUMED (gal.) 0.128 | FUEL REMAINING (gal.) 164.09 | FUEL ECONOMY (mpg) 1.48 |
| | | *** | | LECTRIC | C DRIVE | VE DATA | *** | ıt. | | |
| | | | | INNER | SPROCKET MOTOR | TOR | 0 | OUTER SPROC | SPROCKET MOTOR | |
| GENERATOR SPEED (rpm) 10400.00 | | GENERATOR POWER (Kw) 269.72 | 98 (r. | SPEED TI (rpm) (- | TORQUE H (ft-1b) 87.82 | HORSEPOWER (hp) 166.38 | SPEED (rpm) 9950.26 | TORQUE (ft-1b) 87.82 | HORSEPOWER (hp) 166.38 | JWER) 38 |
| BUSS VOLTAGE (volts) 14.93 | | BUSS CURRENT (amps) 18071.39 | VOLTAGE (volts) 14.93 | | CURRENT (amps) 9035.70 | FIELD FOWER (Kw) 15.0 | VOLTAGE (volts) | CURRENT (amps) 9035,70 | | FIELD POWER (Kw) 15.0 |
| | | | | | (| | | | | |

本字本字

| | ELECTRIC DRIVE TYPE HOPOl P-G | | RANGE ESTIMATE (miles) 269.08 | | NET DRIVE | EFFICIENCY (%) 64.68 | | FUEL ECONOMY (mpg) 1.54 | | | JWER 52 | FIELD FOWER (Kw) 15.0 |
|----------------|-------------------------------------|----------|--|--|----------------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING | | AVB. FORWARD VELOCITY (mph) 11.30 | | | TORQUE (ft-1b) 1367.17 | | FUEL REMAINING (gal.) 163.97 | | OUTER SPROCKET MOTOR | E HORSEFOWER b) (hp) 57 166.62 | |
| | 900 | | | 常米米丰 | OCKET | SPEED (rpm) 620.90 | * | FUEL NSUMED gal.) 0.123 | | TER SPRO | TORQUE (ft-1b) 84.57 | CURRENT (amps) 8700.72 |
| * * * | ENGINE VTA-903 | *** | CUMMULATIVE TIME (sec) 1570.19 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 161.63 | * * * | 0 | *** | חם יים | SPEED (rpm) 10348.27 | VOLTAGE (volts) 15.52 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 26000 | MANCE DATA | | TORQUE HOR9 (ft-1b) 1367.17 14 | AGY DATA | FUEL CONSUMPTION (1b/hr) 199.87 | VE DATA | TOR | HORSEPOWER 166.62 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | A COURSE | TIME (sec) 17,48 | PERFORMANCE | SPROCKET | SPEED (rpm) 620.90 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | IC DRIVE | INNER SPROCKET MOTOR | TORQUE H (ft-1b) 84.57 | CURRENT (amps) 8700.72 |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | MISSION | DE RADIUS) (ft) 4 o | VEHICLE | INNER | HORSEPOWER (hp) 161.63 | ENGINE | SEGMENT ENERGY LOSS (btu) 2180.78 | ELECTRIC | INNER | SPEED (rpm) 10348.27 | VOLTAGE (volts) 15.52 |
| * * * | SURFACE | *** | DISTANCE GRADE (%) (%) 1000 2.4 | 10000000000000000000000000000000000000 | | LATERAL ACCELERATION (g's) 0.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 553388.80 | *** | | GENERATOR FOWER (KW) 270.11 | EUSS CURRENT (amps) 17401.44 |
| | | | SEGMENT NO. (#) 26 | | | TRACTIVE EFFORT (K-1bs) | | SEGMENT ENERGY (btu) 6175.19 | | - | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 15.52 |
| | COURSE DATA INPUT BY USER | | LAP NO. S (#) | | | FORWARD VELOCITY (mph) 39.00 | B-161 | HORSEPOWER GENERATED (hp) 499.73 | | | 95 | |

事事事事 ELECTRIC DRIVE PERFORMANCE ****

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 279.81 | | NET DRIVE | EFFICIENCY (%) 64.67 | | FUEL ECONOMY (mpg) 1.60 | | | JWER 11 | FIELD POWER (Kw) | • |
|------------|-------------------------------------|----------|--|-------------|----------------|---|----------|--|----------|----------------------|---|---------------------------------------|---|
| | ENGINE SCHEDULING CONSTANT | ٠ | AVG. FORWARD VELOCITY (mph) 11.61 | | | TORQUE (ft-1b) . 1314.81 | | FUEL REMAINING (gal.) 163.85 | | ET MOTOR | HORSEPOWER (hp) 166.41 | FIELD (A | |
| | SCHEI | | | *** | OCKET | SPEED (rpm) 644.78 | ı | | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 81.33 | CURRENT (amps) 8367.49 | |
| 米米米米 | ENGINE VTA-903 | *** | CUMMULATIVE TIME (sec) 1587.03 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 161.41 | *** | FUEL CONSUMED (gal.) 0.118 | 常常常 | דטס | SPEED (rpm) 10746.28 | VOLTAGE (volts) 16.12 | |
| PARAMETERS | T. VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 27000 | MANCE DATA | | TORQUE HOR (ft-1b) 1314.81 1 | RGY DATA | FUEL CONSUMPTION (1b/hr) 199.60 | VE DATA | ror | HORSEFOWER (hp) 166.41 | FIELD POWER (Kw) 15.0 | |
| | MAX. LAT ACCEL. (g's) 0.50 | A COURSE | TIME (cer) 16.83 | PERFORMANCE | SPROCKET | SPEED (rpm) 644.78 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MOTOR | TORGUE H((ft-1b) 81.33 | CURRENT (amps) 8367.49 | (|
| MISSION | MAX. VELOCITY (mph) 45.00 | NOTSSIW | GRADE RADIUS (*) (#+) (#+) 2.05 0 | VEHICLE | INNER | HORSEPOWER (hp) 161.41 | ENGINE | SEGMENT ENERGY LOSS (btu) 2098.35 | ELECTRIC | INNER | SPEED T (rpm) (| VOLTAGE C (volts) (| |
| * * * * | SURFACE | **** | DISTANCE GR | > 常常常来 | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 559328.50 | *** | | GENERATOR POWER (KW) 259,76 | BUSS CURRENT (amps) 16734.97 | |
| | | | SEGMENT NO. (#) 27 | | | TRACTIVE EFFORT (K-1bs) 2,99 | | SEGMENT ENERGY (btu) 5939,78 | | | GENERATOR SPEED (rpm) 10400,00 | BUSS VOLTAGE (volts) 16.12 | |
| | COURSE DATA INPUT BY USER | | LAP NO. (#) | | | FORWARD VELBCITY (mph) 40.50 | -162 | HORSEPOWER GENERATED (hp) 499.17 | | | . GE | | |

**** ELECTRIC DRIVE PERFORMANCE

| | ELECTRIC DRIVE TYPE HOPOl P-G | | RANGE ESTIMATE (miles) 289.76 | | HOT BO | EFFICIENCY (%) 64.69 | | FUEL ECONOMY (mpg) 1.66 | | | JWER 53 | FIELD POWER (Kw) 15.0 |
|------------|-------------------------------------|---------|--|-------------|------------|---------------------------------------|----------|--|----------|----------------------|---|---|
| | ENGINE SCHEDULING CONSTANT | | AVG. FORWARD VELOCITY (mph) 11.91 | | | TORQUE (ft-1b) 1269.58 | | FUEL REMAINING (gal.) 163.73 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 166.63 | |
| | SCHE 100 | | | *** | SPROCKET | SPEED (rpm) 658.66 | | 1ED | | ER SPROCE | TORQUE (ft-1b) 78.53 | CURRENT (amps) 8079.67 |
| *** | ENGINE | *** | CUMMULATIVE TIME (sec) 1603.26 | DATA ** | OUTER SPRO | HORSEPOWER (hp) 161.63 | * * * * | FUEL CONSUMED (gal.) 0.114 | ** | ידעם | SPEED (rpm) 11144.29 | VOLTAGE (volts) 16.72 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 28000 | | | TORQUE HOR (ft-1b) 1269.58 | GY DATA | FUEL CONSUMPTION (1b/hr) 199.88 | JE DATA | OR | HORSEPOWER (hp) 166.63 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED (rpm) 668.66 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | INNER SPROCKET MOTOR | TORQUE HO (ft-1b) 78.53 | CURRENT F (amps) |
| MISSION | MAX. VELOCITY (mph) 45.00 | NOISSIM | RADIUS (ft) 0 | VEHICLE F | INNER S | HORSEPOWER (hp) 161.63 | ENGINE | SEGMENT ENERGY LOSS (btu) 2025.07 | ELECTRIC | INNER | SPEED T (rpm) (| VOLTAGE C (volts) (|
| * * * * | SURFACE | *** | DISTANCE GRADE (ft) (%) 1000 1.74 | | | LATERAL ACCELERATION H (g's) | *** | CUMMULATIVE ENERBY USED (btu) 565062.90 | *** | | GENERATOR POWER (Kw) 270.13 | BUSS CURRENT ((amps) 16159.34 |
| | | | SEGMENT ND. (#) 28 | | | TRACTIVE EFFORT (K-1bs) 2.89 | | SEGMENT ENERGY (btu) 5734.37 | | • | GENERATOR SPEED (rpm) 10400.00 | BUSS VDLTAGE (volts) 16.72 |
| | COURSE DATA INPUT BY USER | | . LAP NO. S (#) | | | FORWARD VELOCITY (mph) 42.00 | B-163 | HORSEPOWER GENERATED (hp) 499.75 | | | 9E 1C | |

| | ELECTRIC DRIVE TYPE HOPOl P-G | | RANGE ESTIMATE (miles) 299.97 | | AUT AG TEN | EFFICIENCY (%) 64.69 | | FUEL ECONOMY (mpg) 1.71 | | | ίζ | WER | |
|------------|--------------------------------------|---------|--|---|----------------|---|------------|--|----------|----------------|---|---------------------------------------|---|
| | SCHEDULING . I | | AVB. FORWARD VELOCITY (mph) 12.22 | | | TORQUE (+t-1b) | | FUEL REMAINING (gal.) 163.62 | | SPROCKET MOTOR | HORSEPOWER (hp) 166.71 | FIELD POWER (KW) 15.0 | |
| | SCHE | | | * | CKET | SPEED (rpm) 692.54 | | | | A SPROCKE | TORQUE (ft-1b) 75.86 | CURRENT (amps) 7804.55 | |
| *** | ENGINE | * * * * | CUMMULATIVE TIME (sec) 1618.93 | * * * * • • • • • • • • • • • • • • • • | OUTER SPROCKET | HORSEPOWER (hp) | 完本字 | FUEL CONSUMED (gal.) 0.110 | *** | OUTER | SPEED (rpm) 11542.30 | VOLTAGE (volts) 17.31 | |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (4+) 29000 | ANCE DATA | | TORQUE HORS (ft-1b) 1226.35 16 | GY DATA | FUEL CONSUMPTION (15/hr) 199.97 | E DATA | Ä | HORSEPOWER (hp) 166,71 | FIELD POWER (Kw) 15.0 | |
| | MAX. LAT. ACCEL. (g's) o.so | COURSE | TIME (apr) | PERFORMANCE | SPROCKET | SPEED (rpm) 692.54 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | C DRIVE | SPROCKET MOTOR | TORQUE HOR (ft-1b) 75.85 | CURRENT F1 (amps) 7804.55 | (|
| NOISSIE | MAX. VELDCITY (mph) 45.00 | NOISSIM | RADE RADIUS | VEHICLE | INNER | HORSEPOWER (hp) 161.71 | ENGINE | SEGMENT ENEKGY LOSS (btu) 1955,77 | ELECTRIC | INNER | SPEED T (rpm) (11542.30 | VOLTAGE C (valts) (| |
| * * * * | SURFACE | *** | ,DISTANCE GRADE | * * * * | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 570601.60 | *** | | GENERATOR FOWER (Kw) 270.25 | BUSS CURRENT (amps) 15609.09 | |
| | | | SEGMENT NO. (#) 29 | | | TRACTIVE EFFORT (K-1bs) 2.79 | | SEGMENT ENERGY (btu) 5538.76 | | | GENERATOR SPEED (rpm) 10400,00 | BUSS VOLTAGE (volts) 17.31 | |
| | COURSE DATA INPUT BY USER | | LAP NO. S (#) | | | FORWARD VELOCITY (mph) | | HORSEPOWER GENERATED (hp) 499.94 | | | 9B 10 | | |
| | | | | | | B-1 | 04 | | | | | | |

| | ELECTRIC DRIVE TYPE HOPO1 P-G | | RANGE ESTIMATE (miles) 317.52 | | NET DRIVE | EFFICIENCY (%) 64.49 | | FUEL ECONOMY (mpg) 1.81 | | | ⊝GWER oo} oo4 | FIELD POWER (Kw) 15.0 |
|------------|--------------------------------------|----------|--|-------------|----------------|--|----------|--|-----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | AVG. FORWARD VELOCITY (mph) 12.52 | | . ! | iD TORGUE n) (ft-1b) 42 1159.39 | | FUEL REMAINING (gal.) 163.52 | | OUTER SPROCKET MOTOR | TORQUE HORSEPOWER (ft-1b) (hp) 71,71 163.04 | CURRENT FIEL (amps) 7378.37 |
| *** | ENGINE | *** | CUMMULATIVE TIME (sec) 1634.08 | **** [] | OUTER SPROCKET | HORSEPOWER SPEED (rpm) (rpm) 158.15 716.42 | * * * | FUEL CONSUMED (gal.) 0.104 | *** | OUTER S | SPEED TO (rpm) (f 11940.30 | VOLTAGE CL (volts) (a 17.91 |
| PARAMETERS | VEHICLE 19.5 TON | E DATA | CUMMULATIVE DISTANCE (ft) 30000 | ANCE DATA | | TORQUE HORS (ft-1b) 1159.39 15 | GY DATA | FUEL CONSUMPTION (1b/hr) 195.43 | E DATA | H. | HORSEPOWER (hp) 163.04 | FIELD POWER (KW) |
| ION FARAL | MAX. LAT. ACCEL. (g's) 0.50 | N COURSE | TIME (sec) 15.15 | FERFORMANCE | SPROCKET | SPEED (rpm) (716.42 1 | / ENERGY | ENGINE SPEED (rpm) 2600.00 | RIC DRIVE | R SPROCKET MOTOR | TORQUE HO (ft-1b) 71.71 | CURRENT F (amps) |
| MISSIM | MAX. VELOCITY (mph) 45.00 | MISSION | GRADE RADIUS (ft) | VEHICLE | INNER | HORSEPOWER (hp) 158.15 | ENGINE | SEGMENT ENERGY LOSS (btu) 1865.52 | ELECTR | INNER | SPEED (rpm) 11940.30 | VOLTAGE (volts) 17.91 |
| * | SURFACE COMPACTED SOIL | *** | DISTANCE GF (ft) (ft) 1000 | **** | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 575854.50 | *** | | GENERATOR FOWER (KW) 264,30 | BUSS CURRENT (amps) 14756.74 |
| | | | SEGMENT ND. (#) | | | TRACTIVE EFFORT (K-1bs) 2.64 | | SEGMENT ENERGY (btu) 5252.86 | | • | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 17.91 |
| | COURSE DATA INPUT BY USER | | LAP NO. (#) | | | FORWARD VELOCITY (mph) 45.00 | 3-165 | HORSEPOWER GENERATED (hp) 490.49 | | | <u>. </u> | |

VEHICLE MISSION SIMULATION ELECTRIC

DC HOMOPOLAR MOTOR DRING System 40.0 TON

/ NORTHERN ORDNANCE DIVISION MINNEAPOLIS, MINNESOTA

REVISION DATE: 06/05/85 RUN DATE: 08-22-1985

***** *****

ELECTRICALLY DRIVEN, TRACKED VEHICLE PERFORMANCE IS SIMULATED BY THIS PROGRAM. DETAILED ASPECTS OF VEHICLE PERFORMANCE INVESTIGATED USING THE FOUR RESIDENT SUB-PROGRAMS LISTED BELOW. THE SUB-PROGRAM IN USE IS IDENTIFIED WITH AN ASTERISK. CAN BE INVESTIGATED USING THE FOUR RESIDENT SUB-PROGRAMS LISTED BELOW.

- * 1. > ELECTRIC DRIVE PERFORMANCE
- POWER DRIVE PARAMETERS. ENERGY USAGE, HEAT REJECTION, AND FUEL IMPACT ARE ALSO STEADY STATE VEHICLE PERFORMANCE ANALYSIS WITH DETAILED EMPHASIS ON ELECTRIC
- ı 2.) VEHICLE ACCELERATION PERFORMANCE
- DYNAMIC VEHICLE FERFORMANCE ANALYSIS WHICH REALISTICALLY SIMULATES GROSS VEHICLE MISSION OVER ALL TERRAIN CONDITIONS. ACCELERATION, DECELERATION, BRAKING AND CONSTANT VELOCITY CONDITIONS ARE CONSIDERED.
- ROUTINE 3.) ACCELERATION DYNAMICS

ı

- DETAILED ANALYSIS OF FULL POWER VEHICLE ACCELERATION DURING TURNING AND NON-TURNING MANEUVERS ON USER SELECTED GRADES AND SURFACES. INCREMENTAL DYNAMIC PARAMETERS ARE GENERATED AND TABULATED.
- 4.) REDUCTION DYNAMICS ROUTINE

B-166

DETAILED ANALYSIS OF SPEED/TORQUE LOADING OF ALL VEHICLE FOWER TRAIN REDUCTION FINAL SPROCKET DRIVES AND DIESEL ENGINE INTERFACE ARE INCLUDED IN ELEMENTS.

| | 1 |
|--|---|
| | |
| | - |
| | 1 |
| | 1 |
| | 1 |
| | |
| | |
| | 1 |
| | 1 |
| | |
| | - |
| | |
| | |

DHUD

COURSE: DATA INPUT BY USER

COEFFICIENT OF FRICTION= .7 SURFACE: COMPACTED SOIL

PERFORMANCE LIMITS

MAX. COURSE VELOCITY, mph= 45

MAX. LAT. ACCEL., g's= .5

VEHICLE DATA

FRONTAL AREA, sq. ft.= 68.25

GROSS VEHICLE WEIGHT, tons= 40.0

TREAD WIDTH, in. = 109.84 COEFFICIENT OF DRAG= 1

TRACK LENGTH, in. = 183.07

NUMBER OF SPROCKET TEETH= 11 TRACK PITCH, in. = 7.625

ROLLING RESISTANCE, 16. per ton= 100

MAXIMUM VELOCITY, mph=

MAX. FOWER, hp= 1000 ENGINE: AD-1000

MAX. SPEED, rpm= 3725

2400 SPEED FOR MIN. FUEL, rpm=

COOLING LOSSES, % Ghp= 4

GEN. KG, V/Krpm-A= .005 MOTOR KM V/Krpm-A= .005

€6.

GENERATOR EFF., %=

٥ ه

PEAK MOTOR EFF., %=

TYPE: HoPol F-G

DHUD

DRIVE

ENGINE DATA

ELECTRIC

INLET/EXHAUST LOSSES, % Ghp=

AUXILIARY POWER hp= 12

FUEL CAPACITY, gal. = 350

SCHEDULING: CONSTANT

こうとう しょうこう しゅうしゅうしゅうしゅうしゅう しょうしゅうしゅう しゅうしゅうしゅう

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 32.45 | | | NE DRIVE EFFICIENCY (%) 56.69 | | FUEL ECONOMY (mpg) 0.09 | | | JWER 34 | FIELD POWER (Kw) 15.0 |
|------------|--------------------------------------|----------|---|-------------|------------|---|----------------|---|----------|----------------------|---|--|
| | ENGINE SCHEDULING CONSTANT | | AVG. FORWARD VELOCITY (mph) 4.70 | | | TORQUE (ft-1b) 25126.20 | | FUEL REMAINING (gal.) 347.96 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 3 291.84 | |
| | SCHE | | | ** | SPROCKET | SPEED (rpm) 59.17 | | 1ED | | ER SPROCK | TORQUE (ft-1b) 1036.13 | CURRENT (amps) 130678.10 |
| * | ENGINE AD-1000 | * * . | CUMMULATIVE TIME (sec) 145.07 | I | OUTER SPRO | HORSEPOWER (hp) 283.09 | * * * | FUEL CONSUMED (gal.) 2.043 | *** | ITUO | SPEED (rpm) 1479.34 | VOLTAGE (volts) 2.22 |
| PARAMETERS | VEHICLE 40 TON | Е ВАТА | CUMMULATIVE DISTANCE (ft) 1000 | ANCE DATA | | TORQUE HOR((ft-1b) 25126.20 20 | GY DATA | FUEL CONSUMPTION (1b/hr) 399.41 | E DATA | K | HORSEPOWER (hp) 291.84 | FIELD POWER (Kw) |
| | MAX. LAT. ACCEL. (9's) 0.50 | A COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED (rpm) 59.17 28 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | IC DRIVE | INNER SPROCKET MOTOR | TORQUE HOI (ft-1b) 1036.13 | CURRENT F (amps) |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | MISSION | GRADE RADIUS (%) (ft) 60 0 | VEHICLE | INNER | HORSEPOWER (hp) 283.09 | ENGINE | SEGMENT ENERGY LOSS (btu) 44358.01 | ELECTRIC | INNER | SPEED (rpm) 1479.34 | VOLTAGE (volts) 2.22 13 |
| * * * | SURFACE COMPACTED SOIL | * * * | DISTANCE GRAI (ft) (%) 1000 60 | *** | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED. (btu) 102412,50 | * * * * | | GENERATOR POWER (KW) 579.95 | BUSS CURRENT (amps) 261356.30 |
| | | | SEGMENT NO. (#) | | | TRACTIVE EFFORT (K-1bs) 45.16 | | SEGMENT ENERGY (btu) 102412.50 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 2.22 |
| | COURSE DATA INPUT BY USER | | LAP NG. S (#) | | • 0 | FORWARD VELOCITY (mph) 4.70 | B -1 67 | HORSEPOWER GENERATED (hp) 998.78 | | | GE 10 | |

| | ELECTRIC DRIVE TYPE HOPOl P-G | | RANGE ESTIMATE (miles) .41.62 | | | NET DRIVE EFFICIENCY (%) 63.43 | | FUEL ECONOMY (mpg) 0.12 | | | Д | OWER O |
|------------|--------------------------------------|----------|---|---------------|---------------|---------------------------------------|----------|--|----------|----------------------|--------------------------------------|-------------------------------------|
| | ENGINE SCHEDUL ING CONSTANT | | AVG. FORWARD VELOCITY (mph) 5.27 | | | TORQUE (ft-1b) 21941,26 | | FUEL REMAINING (gal.) 346.36 | | OUTER SPROCKET MOTOR | . HORSEPOWER (hp) | FIELD POWER (Kw) |
| | 1 | | | *** | SPROCKET | SPEED (rpm) 75.54 | 4 | IL IMED .) 93 | | ER SPROC | TORQUE (ft-1b) 904.79 | CURRENT (amps) 101951.80 |
| * * * | ENGINE AD-1000 | * * * | CUMMULATIVE TIME (sec) 258.70 | I | OUTER SPR | HORSEPOWER (hp) 315.58 | *** | FUEL CONSUMED (gal.) 1.593 | * * * | TUO | SPEED (rpm) 1888.52 | VOLTAGE (volts) 2.83 |
| FARAMETERS | VEHICLE | SE DATA | CLMMULATIVE DISTANCE (ft) 2000 | ANCE DATA | | TORGUE HOR((ft-1b) 21941.26 3: | SGY DATA | FUEL CONSUMPTION (1b/hr) 397.63 | JE DATA | NG. | HORSEPOWER (hp) 325.34 | FIELD POWER (Kw) 15.0 |
| - 1 | MAX. LAT. ACCEL. (g's) 0.50 | A COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED (rpm) 75.54 2 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | INNER SPROCKET MOTOR | TORQUE HO (ft-1b) 904.79 | CURRENT F (amps) |
| MISSION | MAX. VELOCITY (mph) 45.00 | MISSIM | GRADE RADIUS (%) (ft) 49.4 0 | VEHICLE F | INNER | HORSEPOWER (hp) 315.58 | ENG I NE | SEGMENT ENERGY LOSS (btu) 29228,82 | ELECTRIC | INNER | SPEED T (rpm) (1888,52 | VOLTAGE C (valts) (2.83 101 |
| *** | SURFACE COMPACTED SOIL | *** | DISTANCE 6F (ft) 1000 | > * * * * · | i control | ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 182336.90 | * * * | | GENERHION FOWER (Kw) 577.62 | BUSS CURRENT (amps) 203903.50 |
| | | | SEGMENT NO. (#) | | 10.4 TO A O T | THEORT (K-1bs) 39.44 | | SEGMENT ENERGY (btu) 79924.40 | | echipportop | SPEED (rpm) | BUSS VOLTAGE (volts) 2.83 |
| | COURSE DATA INPUT BY USER | | LAP ND. (#) | | | VELOCITY (mph) 6.00 | ·168 | HORSEPOWER GENERATED (hp) 995.06 | | i. | 100 | |

常事常常

| | | | * * * | 1 | MISSION | | PARAMETERS | **** 0 | * | | |
|-----|---|--|--|----------------------------|---|-------------------------------------|--|------------------------------|--|---|---|
| | COURSE | | SURFACE | | MAX. VELOCITY | MAX. LAT. | AT. VEHICLE | LE ENGINE | | ENGINE SCHEDULING | ELECTRIC DRIVE TYPE |
| 70 | DATA INPUT BY USER | Y USER | COMPACTED SOIL | | (mph) 45.00 | (g.g) 0.50 | 40 TON | AD-1000 | • | CONSTANT | HoPol P-6 |
| | | | *** | Ψ | NOISS | A COURSE | SE DATA | * * * ! | * | | |
| | LAP NO. (#) | SEGMENT NO. (#) | DISTANCE (ft) 1000 | GRADE (%) | RADIUS (ft) O | TIME (sec) 75.76 | CUMMULATIVE DISTANCE (ft) | | CUMMULATIVE TIME (sec) 425.37 | AVG. FORWARD VELOCITY (mph) 6.41 | RANGE ESTIMATE (miles) 62.08 |
| | | | * * * * | VEHI | ICLEF | ERFOF | PERFORMANCE 1 | DATA | ** | | |
| | | 1 2 3 4 1 | i i i | | INNER S | SPROCKET | | OUTER | SPROCKET | | |
| B- | FUKWARD VELOCITY (mph) 9.00 | KACTIVE EFFORT (K-1bs) 27.91 | CATERAL ACCELERATION (g's) 0.000 | HORE | RSEPOWER (hp) | SPEED (rpm) 113.31 | TORQUE (ft-1b) 15527.92 | HORSEFOWER (hp) 335.01 | SPEED (rpm) | TORQUE (ft-1b) 15527.92 | NET DRIVE EFFICIENCY (%) 67.02 |
| 170 | | | *** | ₩ | NGINE | / ENE | ENERGY DATA | | *** | | |
| | HORSEPOWER GENERATED (hp) 999,65 | SEGMENT ENERGY (btu) 53528.72 | IT CUMMULATIVE ' ENERGY USED (btu) ' 299634.90 | | SEGMENT ENERGY LOSS (btu) 17651,26 | ENGINE SPEED (rpm) 3200.00 | E FUEL CONSUMPTION (1b/hr) 0 399.83 | | FUEL CONSUMED (gal.) 1.068 | FUEL REMAINING (gal.) 344.03 | FUEL ECONOMY (mpg) 0.18 |
| | | | *** | İ | ELECTRIC | C DRIVE | VE DATA | * * * | * | | |
| | ū | GENERATOR | OUTVOOR | | INNER | SPROCKET MOTOR | JTOR | | OUTER SPRO | SPROCKET MOTOR | |
| | o = | SPEED (rpm) 10400.00 | DENERHIUN (KW) 580.50 | 9P 7.7 283 | SPEED TC (+ | TORQUE (ft-1b) 640.33 | HORSEPOWER (hp) 345.37 | SPEED (rpm) 2832.79 | TORQUE (ft-1b) | E HORSEFOWER b) (hp) 33 345.37 | WER 7 |
| | | BUSS VOLTAGE (volts) 4.25 | BUSS CURRENT (amps) 136615.00 | VOLTAGE (volts) 4.25 | | CURRENT (amps) 68307.50 | FIELD POWER (Kw) 15.0 | VOLTAGE (volts) 4.25 | CURRENT (amps) 68307.50 | NT FIELD POWER) (Kw) 50 15.0 | OWER |
| | | | | | | | | | | | |

| | ELECTRIC DRIVE TYPE , | | RANGE ESTIMATE (miles) 72.62 | | | EFFICIENCY (%) 67.61 | | FUEL ECONOMY (mpg) 0.21 | | | OWER) 59 | FIELD FOWER (Kw) 15.0 |
|------------|---------------------------------------|---------|---|-------------|------------|---|----------|--|----------|----------------------|---|--|
| | ENGINE SCHEDULING CONSTANT | | AVG. FORWARD VELOCITY (mph) 6.96 | | | TORQUE (ft-1b) 13395.19 | | FUEL REMAINING (gal.) 343.11 | | OUTER SPROCKET MOTOR | HORSEFOWER) (hp) 8 347.59 | |
| | 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | | | * * * * | SPROCKET | SPEED (rpm) 132.20 | ılı. | MED 13 | | ER SPROC | TORQUE (ft-1b) 552.38 | CURRENT (amps) 58406.58 |
| *** | ENGINE AD-1000 | *** | CUMMULATIVE TIME (sec) 490.31 | 1 | OUTER SPRO | HORSEPOWER (hp) 337.16 | *** | FUEL CONSUMED (gal.) 0.913 | *** | דטם | SPEED (rpm) 3304.92 | VOLTAGE (volts) 4.96 |
| PARAMETERS | VEHICLE | E DATA | CUMMULATIVE DISTANCE (ft) 5000 | ANCE DATA | | TORQUE HOR((ft—1b) 13395.19 | GY DATA | FUEL CONSUMPTION (1b/hr) 398.75 | JE DATA | OR | HORSEPOWER (hp) 347.59 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | COURSE | TIME (sec) 64.94 | PERFORMANCE | SPROCKET | SPEED (rpm) 132.20 13 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | SPROCKET MOTOR | TORQUE HO (ft-1b) 552.38 | CURRENT F (amps) 58406.58 |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | NOISSIM | E RADIUS (ft) 0 | VEHICLE | INNER S | HORSEPOWER (hp) 337.16 | ENGINE | SEGMENT ENERGY LOSS (btu) 14828.73 | ELECTRIC | INNER | SPEED T (rpm) (3304.92 | VOLTAGE C (volts) (4.96 58 |
| *** | | 1 | GRADE (%) 25.9 |] [] | | | 1 | VE SED | 1 | | | |
| * | SURFACE | *** | DISTANCE (ft) 1000 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 345413.40 | *** | | GENERATOR POWER (Kw) 579.09 | BUSS CURRENT (amps) 116813.20 |
| | | | SEGMENT NO. (#) 5 | | | TRACTIVE EFFORT (K-1bs) 24.08 | | SEGMENT ENERGY (btu) 45778.49 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 4.96 |
| | COURSE DATA INPUT BY USER | | LAP NG. S. (#) | | | FORWARD VELOCITY (mph) 9 | -171 | HORSEPOWER GENERATED (hp) 997.40 | | | 9E | |

本本本本 ELECTRIC DRIVL PERFORMANCE ***

• •

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 82.85 | | | NET DRIVE EFFICIENCY (%) 68.21 | | FUEL ECONOMY (mpg) 0.24 | | | | īκ |
|------------|--------------------------------------|----------|---|-------------|-----------|---|----------|--|----------|----------------------|---------------------------------|---|
| | ENGINE ESCHEDULING DR | | G. FORWARD VELOCITY (mph) 7.48 | | | TORQUE E (+t-1b) | | FUEL REMAINING (gal.) 342.31 | | F MOTOR | HORSEPOWER (hp) 351.23 | FIELD POWER (Kw) |
| | SCHEI | | AV | ** | SPROCKET | SPEED (rpm) 151.08 | ıŁ | | | ER SPROCKET MOTOR | TORQUE (ft-1b) 488.40 | CURRENT (amps) 51190.62 |
| 半半半半 | ENGINE | *** | CUMMULATIVE TIME (sec) 547.12 | 1 | OUTER SPR | HORSEFOWER (hp) 340.69 | *** | FUEL CONSUMED (gal.) 6.800 | * * * | OUTER | GPEED (rpm) 3777.05 | VOLTAGE (valts) 5.67 |
| FARAMETERS | T. VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 6000 | MANCE DATA | | TORGUE HORS (ft-1b) (11843.66 34 | REY DATA | FUEL CONSUMPTION (1b/hr) 399.49 | ZE DATA | OR | HORSEPOWER (hp) 351.23 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | I COURSE | TIME (sec) 56.82 | PERFORMANCE | SPROCKET | SPEED (rpm) 151.08 1 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | INNER SPROCKET MOTOR | TORQUE HO! (ft-1b) 488.40 | CURRENT F: (amps) 51190.62 |
| MISSION | MAX. VELOCITY (mph) 45.00 | NOISSIM | GRADE RADIUS (%) (ft) 22.1 0 | VEHICLE P | INNER SP | HORSEPOWER (hp) 340.69 | ENGINE | SEGMENT ENERGY LOSS (btu) 12752.66 | ELECTRIC | INNER | SPEED TOI (rpm) (f1 | VOLTAGE CUF (volts) (ar 5.67 5119 |
| *** | SURFACE COMPACTED SOIL | * * * | DISTANCE G (ft) 1000 | *** | LATERAL | ACCELERATION (g's) | * * * | CUMMULATIVE ENERGY USED (btu) 385531.00 | *** | GENERATOR. | CKW) | BUSS CURRENT (amps) 102381.20 |
| | | | SEGMENT NO. (#) 6 | | TRACTIVE | EFFORT (K~1bs) 21.29 | | SEGMENT ENERGY (btu) 40117.60 | | GENERATOR | SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 5.67 |
| | COURSE DATA INPUT BY USER | | LAP NO. SE (#) | | FORWARD | VELDCITY (mph) 12.00 | 72 | HORSEPOWER GENERATED (hp) 998.93 | | 2119 | 104 | >~ |

宇宇宇

| | | *** | İ | MISSION | | PARAMETERS | *** | | | |
|---|---|--|---|-------------------------------|-------------------------------------|--|--|-------------------------------|---|---|
| COURSE | | SURFACE | MA VELO | MAX. VELOCITY | MAX. LAT. | . VEHICLE | ENGINE | EN | ENGINE SCHEDULING | ELECTRIC DRIVE TYPE |
| DATA INPUT BY USER | | COMPACTED SOIL | (mpm) 45.00 | 00 | 0.50 | 40 TON | AD-1000 | N 00 | CONSTANT | HoPol P-6 |
| | | *** | MISS | ISSION | COURSE | SE DATA | * * | | | |
| LAP NO. SE (#) 1 | SEGMENT NO. (#) 7 | DISTANCE (ft) . | GRADE R (%) 19.1 | RADIUS (ft) O | TIME (sec) 50.51 | CUMMULATIVE DISTANCE (ft) 7000 | CUMMULATIVE TIME (sec) 597.63 | Ą | AVB. FORWARD VELOCITY (mph) 7.99 | RANGE ESTIMATE (miles) 93.46 |
| | | *** | VEHICLE | | PERFORMANCE | | ** ATAU | *** | | |
| | | | H | INNER SPE | SPROCKET | | OUTER SPRO | SPROCKET | | F 1 2 4 7 1 2 |
| FORWARD VELOCITY (mph) 13.50 | TRACTIVE EFFORT (K-1bs) 19.04 | LATERAL ACCELERATION (g's) 0.000 | HORSEFOWER (hp) 342.81 | DWER 31 | SPEED (rpm) 169.97 1 | TORQUE HOR (ft—1b) 10592.96 3 | HORSEPOWER (hp) 342.81 | SPEED (rpm) 169.97 | TORGUE (ft-1b) 10592.96 | NEI DRIVE EFFICIENCY (%) 68.79 |
| 3-173 | | * * * | ENG | NGINE | / ENERGY | RGY DATA | *** | d. | | |
| HORSEPOWER GENERATED (hp) 996.62 | SEGMENT ENERGY (btu) 35577,47 | T CUMMULATIVE ENERGY USED (btu) 421108.50 | SEGMENT ENERGY LOSS (btu) 11102.28 | 4ENT / LOSS :u) 2.28 | ENGINE SPEED (rpm) 3200.00 | FUEL CONSUMPTION (1b/hr) 398.38 | FUEL CONSUMED (gal.) | | FUEL REMAINING (gal.) 341.60 | FUEL ECONOMY (mpg) 0.27 |
| | | * * * * | | LECTRIC | DRIVE | VE DATA | * * * * | | | |
| | | | | INNER SE | SPROCKET MOTOR | roR | OUTER | | SPROCKET MOTOR | |
| 10 10 | GENERAIUK SPEED (rpm) 10400.00 | GENERALUR POWER (Kw) 578.59 | SPEED (rpm) 4249.18 | - | TORQUE HC (ft-1b) 436.82 | HORSEPOWER (hp) 353.41 | SPEED (rpm) 4249.18 | TORGUE (ft-1b) 436.82 | HORSEPOWER (hp) 353.41 | JWER 11 |
| | BUSS VOLTAGE (valts) 6.37 | BUSS CURRENT (amps) 90777.19 | VOLTAGE (volts) 6.37 | | CURRENT F (amps) 45388.60 | FIELD POWER (Kw) 15.0 | VOLTAGE (valts) 6.37 | CURRENT (amps) 45388.60 | | FIELD FOWER (Kw) |
| | | | | | | | | | | |

| | ELECTRIC DRIVE TYPE | HoPol P-6 | | RANGE ESTIMATE (miles) 103,79 | | HOT GOT THIN | NET DAIVE (%) 69.39 | | FUEL ECONOMY (mpg) 0.30 | | | 로 12 도 12 | D POWER (Kw) 15.0 |
|------------|------------------------|--------------------|---------|---|---|----------------|---|----------|--|----------|----------------------|---|--------------------------------------|
| | ENGINE SCHEDULING | CONSTANT | | AVG. FORWARD VELOCITY (mph) 8.49 | | | TORQUE (ft-1b) 9621.06 | | FUEL REMAINING (gal.) 340,97 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 1 356.65 | FIEL |
| | SCHE | CON | | | *** | OCKET | SPEED (rpm) 188.85 | d. | veD | | ER SPROCK | TORQUE (ft-1b) 396.74 | CURRENT (amps) 40870,45 |
| *** | ENGINE | AD-1000 | * * * | CUMMULATIVE TIME (sec) 643.08 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 345.95 | *** | FUEL CONSUMED (gal.) 0.639 | * * * | TUO | SPEED (rpm) 4721.31 | VOLTAGE (volts) 7.08 |
| PARAMETERS | VEHICLE | 40 TON | E DATA | CUMMULATIVE DISTANCE (ft) 8000 | ANCE DATA | | TORQUE HORS (ft-1b) (9621.06 34 | GY DATA | FUEL CONSUMPTION (1b/hr) 398,60 | E DATA | H. | HORSEPOWER (hp) 356.65 | FIELD FOWER (Kw) 15.0 |
| | MAX. LAT. | (d, e) 0.50 | COURSE | TIME (sec) 45.45 | PERFORMANCE | SPROCKET | SPEED (rpm) 188.85 | / ENERGY | ENGINE SPEED (rpm) | C DRIVE | INNER SPROCKET MOTOR | TORQUE HO (ft-1b) 396.74 | CURRENT F (amps) |
| MISSION | MAX. VELOCITY | (mph) 45.00 | MISSION | RADIUS (ft) 0 | | INNER S | HORSEPOWER (hp) 345.95 | ENGINE | SEGMENT ENERGY LOSS (btu) 9805.11 | ELECTRIC | INNER | SPEED TI (rpm) (- | VDLTAGE CI (volts) (. 7.08 401 |
| *** | SURFACE | COMPACTED SOIL | *** | DISTANCE GRADE (%) (%) 16.8 | H H H H H H H H H H H H H H H H H H H | | LATERAL ACCELERATION H (g's) 0.000 | * * * | CUMMULATIVE ENERGY USED (btu) 453143.20 | *** | | GENERATOR POWER (Kw) 578.89 | BUSS CURRENT V (amps) (|
| | | | | SEGMENT ND. (#) 8 | | | TRACTIVE EFFORT (K-1bs) 17.29 | | SEGMENT ENERGY (btu) 32034.69 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 7.08 |
| | COURSE | DATA INPUT BY USER | | LAP ND. SI (#) | | | FORWARD VELOCITY (mph) 15.00 | | HORSEFOWER GENERATED (hp) 997.08 | | | 9E 10 | |
| | | Ď | | - | | | B-174 | | | | | | |

本本本事

| | ELECTRIC DRIVE TYPE , | | RANGE ESTIMATE (miles) 114.02 | | | NET DAIVE (%) 69.49 | | FUEL ECONOMY (mpg) 0.33 | | | DWER 52 | FIELD POWER (Kw) 15.0 |
|------------|--------------------------------------|----------|---|-------------|-----------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING | | AVG. FORWARD VELOCITY (mph) 8.97 | | | TORQUE (ft-1b) 8767.86 | | FUEL REMAINING (gal.) 340.38 | | ET MOTOR | HORSEPOWER (hp) 357.52 | |
| | SCHE | | | *** | SPROCKET | SPEED (rpm) 207,74 | . ك | L MED .> | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 341.56 | CURRENT (amps) 37199.34 |
| *** | ENGINE AD-1000 | * * * | CUMMULATIVE TIME (sec) 684.41 | 1 | OUTER SPR | HORSEPOWER (hp) 346.80 | 字 字 本 字 | FUEL CONSUMED (gal.) 0.581 | ** | TUO | SPEED (rpm) 5193.44 | VOLTAGE (volts) 7.79 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 9000 | ANCE DATA | | TORQUE HORE (ft-1b) (8767.86 34 | 36Y DATA | FUEL CONSUMPTION (1b/hr) 399.13 | ZE DATA | OR | HORSEPOWER (hp) 357.52 | FIELD POWER (Kw) 15.0 |
| | MAX, LAT. ACCEL. (g's) 0.50 | A COURSE | TIME (sec) 41.32 | PERFORMANCE | SPROCKET | SPEED (rpm) 207.74 | / ENERGY | ENGINE SPEED (rpm) | IC DRIVE | SPROCKET MOTOR | TORQUE HO (ft-1b) 361.56 | CURRENT F (amps) 37199.34 |
| MISSION | MAX. VELGCITY (mph) 45.00 | MISSION | GRADE RADIUS (%) (ft) 14.8 0 | VEHICLE | INNER | HORSEPOWER (hp) 346.80 | ENGINE | SEGMENT ENERGY LOSS (btu) 8896.30 | ELECTRIC | INNER | SPEED 1 (rpm) (5193.44 | VOLTAGE C (volts) (7.79 37 |
| * * * | SURFACE | *** | DISTANCE GF (ft) 1000 | > **** | | CAIENAL ACCELERATION (g's) 0.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 482297.70 | *** | | GENERATUR POWER (KW) 579.58 | BUSS CURRENT (amps) 74398.68 |
| | | | SEGMENT NO. (#) | | | TRACTIVE EFFORT (K-1bs) 15.76 | | SEGMENT ENERGY (btu) 29154.57 | | | GENERALUR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 7.79 |
| | COURSE DATA INPUT BY USER | | LAP NO. SI (#) | | | FORWARD VELOCITY (mph) 8 16.50 | 175 | HORSEPOWER GENERATED (hp) 998.18 | | 1 | 10 | |

| ELECTRIC G DRIVE TYPE HOPO1 P-G | | | | | | | FUEL VING ECONOMY (mpg) | | ror | ORSEPOWER (hp) 357.55 | FIELD POWER (Kw) 15.0 |
|-----------------------------------|---|--|--|--|--|--|--|---------|-----------------|------------------------------|---|
| ENGINE SCHEDULIN CONSTANT | | | | OCKET | SPEED TORG (rpm) (+t- 226.62 8037 | * | | | ER SPROCKET MOT | TORQUE HC (ft-1b) | CURRENT F (amps) 34102.13 |
| E ENGINE | | | 1 | OUTER SPE | HORSEFOWER (hp) 346.83 | | | * * * * | TUO | SPEED (rpm) 5665.57 | VOLTAGE (valts) 8.50 |
| 14 | 1 | CUMMULATIVE DISTANCE (ft) 10000 | į | | TORQUE (ft-1b) 8037.85 | 1 | | | оток | HORSEPOWER (hp) 357.55 | FIELD POWER (Kw) 15.0 |
| | 1 | US TIME) (sec) 37.88 | 1 | R SPROCKET | SPEED (rpm) 226.62 | | | | | TORQUE (ft-1b) 331.46 | CURRENT (amps) 34102.13 |
| MAX. VELOCIT (mph) 45.00 | Σ | GRADE RADI (%) (ft 13.1 0 | VEHICLE | INNE | HORSEPOWER (hp) 346.83 | Ш i | SEGMENT ENERGY LO (btu) 8155,44 | | NNI | SPEED (rpm) 5665.57 | VOLTAGE (volts) 8.50 |
| SURFACE OMPACTED SOIL | * * * | DISTANCE (ft) 1000 | *** | | ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 509024.70 | * * * | | CENER FOR (KW) | BUSS CURRENT (amps) 68204.25 |
| | | SEGMENT NO. (#) 10 | | PUTTOVOT | . KHC 17 C EFFORT (K-15s) 14,45 | | SEGMENT ENERGY (btu) 26727.01 | | ant conv | SPEED (rpm) | BUSS VOLTAGE (volts) 8.50 |
| COURSE DATA INFUT BY | | LAP ND. (#) | | 000000 | | _176 | HORSEPOWER GENERATED (hp) 998.26 | | ŭ | 3 2 | |
| | SURFACE VELOCITY ACCEL. VEHICLE ENGINE SCHEDULING | SURFACE VELOCITY ACCEL. VEHICLE ENGINE SCHEDULING (mph) (g's) | SURFACE VELOCITY ACCEL. VEHICLE ENGINE SCHEDULING (mph) (g's) | SURFACE MAX. LAT. MAX. LAT. MAX. LAT. MAX. LAT. MAX. LAT. MACCEL. VEHICLE ENGINE SCHEDULING DRI MPD MP | SURFACE | COURSE SURFACE COMPACTED SOIL COURSE COMPACTED SOIL COMPACTED SOIL COMPACTED SOIL COMPACTED SOIL COMPACTED SOIL COMPACTED SOIL COMPACTED SOIL COMPACTED SOIL COMPACTED SOIL COMPACTED SOIL COMPACTED SOIL COURSE COMPACTED SOIL COURSE COMPACTED SOIL COURSE COMPACTED SOIL COURSE COMPACTED SOIL COURSE COMPACTED SOIL COURSE COMPACTED SOIL COURSE COMPACTED SOIL COURSE COMPACTED SOIL COURSE CO | COURSE SURFACE VELOCITY ACCEL. VEHICLE ENGINE SCHEDLING DR Color C | SURFACE | COURSE | COURSE | COURSE SURFACE COURSE |

| | ELECTRIC DRIVE TYPE | HoPol P-6 | | RANGE ESTIMATE (miles) 134.88 | | 11 11 11 11 | EFFICIENCY (%) | | FUEL ECONOMY (mpg) 0.39 | | .1 | WER 21 | FIELD POWER (Kw) 15.0 |
|------------|------------------------|--------------------|--------|---|-------------|----------------|--|----------|--|---------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING | CONSTANT | | AVG. FORWARD VELOCITY (mph) 9.91 | | | TORQUE (ft-1b) 7412.52 | | FUEL REMAINING (gal.) 339.36 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 357.21 | |
| | SCHE | 200 | | | * | XK FI | SPEED (rpm) 245.51 | | ED) | | R SPROCK | TORQUE (ft-1b) 305.67 | CURRENT (amps) 31449.05 |
| *** | ENGINE | AD-1000 | ** | CUMMULATIVE TIME (sec) 757.25 | **** | OUTER SPROCKET | HORSEPOWER (hp) | * * * | FUEL CONSUMED (gal.) 0.491 | * * * * | OUTE | SPEED (rpm) 6137.71 | VOLTAGE (volts) 9.21 |
| FARAMETERS | VEHICLE | 40 TON | E DATA | CUMMULATIVE DISTANCE (ft) 11000 | ANCE DATA | | TORQUE HOR((ft-1b) 7412.52 | GY DATA | FUEL CONSUMPTION (1b/hr) 398.74 | E DATA | 正 | HORSEPOWER (hp) 357.21 | FIELD FOWER (Kw) 15.0 |
| | MAX. LAT. | (4 k) 0.50 | COURSE | TIME (sec) 34.97 | PERFORMANCE | SPROCKET | SPEED T (rpm) (245.51 7 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | SPROCKET MOTOR | TORQUE HOR (ft-1b) | CURRENT FI (amps) 31449.05 |
| NOISSIM | MAX. VELOCITY | (mph) 45.00 | NOISSI | RADIUS (ft) O | | INNER SP | TRSEPOWER (hp) 346.50 | GINE | SEGMENT ENERGY LOSS (btu) 7522.75 | LECTRIC | INNER S | SPEED TO (rpm) (f- | VOLTAGE CU (volts) (a 9.21 314 |
| | | | Η | GRADE (%) 11.65 | VEHI | | HORS C | Д I | | F | | 4 | 2> > |
| * * * | SURFACE | COMPACTED SOIL | * * * | DISTANCE (ft) 1000 | * * * | 1 | ACCELERATION (9's) | * * * * | CUMMULATIVE ENERGY USED (btu) 533674.20 | *** | | S79.07 | BUSS CURRENT (amps) 62898.09 |
| | | | | SEGMENT NO. (#) 11 | | | TRACTIVE EFFORT (K-1bs) 13.32 | | SEGMENT ENERGY (btu) 24649.49 | | | GENERALUR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 9.21 |
| | COURSE | DATA INPUT BY USER | | LAP ND. (#) | | | FORWARD VELOCITY (mph) 19.50 | B-177 | HORSEPOWER GENERATED (hp) 997,38 | | į | | |

1.

| COUNSE SUPPLIED | | | | | | | 1 | | | |
|--|---|------------------------------------|---------------------------------------|---------------------------------------|-------------------------------|------------------------------|---------------------------------------|-------------------------------|-----------------------------------|---|
| A | COURSE | | SURFACE | VELOC | | | ENGINE | ENGI | NE ILING | ELECTRIC DRIVE TYPE |
| CHANGE C | DATA INFUT BY | USER | COMPACTED SOIL | 45.00 | | | AD-1000 | CONST | ANT | 1 |
| COMPAND SEGNENT NO. C(41) C(2) C(41) | | | * * * | Σ | | | * * * * | | | |
| FORWARD TRACTIVE LATERAL INNER SPROCKET OUTER S | LAP NO. (#) | SEGMENT NO (#) | | | | | CUMMULATI(TIME (sec) 789.72 | | FORWARD LOCITY mph) o.37 | RANGE ESTIMATE (miles) 145.51 |
| FORWARD TRACTIVE CATERAL HORSEPOWER SPEED CAPA | | | 1 | | 1 | 1 | | ** | | |
| VELOCITY FFORT ACCELERATION HORSEPOWER SPEED TORQUE HORSEPOWER SPEED TORQUE (4t-1b) | daynada | DUTTOVOT | I GOTT A | INI | | | OUTER SPRC | CKET | | |
| HORSEPOWER SEGMENT CUMMULATIVE SEGMENT ENGINE FUEL FUEL FUEL FUEL FUEL FUEL FUEL FUE | | KHC11VE (K-11bs) 12.35 | | HORSEFOWE (hp) | | | RSEPOWER (hp) 345.94 | 1 0- | TORQUE (ft—1b) 6872.08 | NEI DKIVE EFFICIENCY (%) 69.47 |
| SEGMENT CUMMULATIVE SEGMENT ENGINE FUEL FUEL | 78 | | * * * | ENGI | | | 1 | | | |
| SENERATOR INNER SPROCKET MOTOR CUTER SPROCKET MOTOR POWER SPEED TORQUE HORSEPOWER SPEED (Kw) (rpm) (ft-1b) (hp) (ft-1b) 578.15 6609.84 283.38 356.64 6609.84 283.38 BUSS CURRENT FIELD FOWER VOLTAGE CURRENT (amps) (volts) (amps) (kw) (volts) (amps) 58312.26 9.91 29156.13 15.0 9.91 29156.13 | HORSEPOWER GENERATED (hp) 995,92 | 8 | F | SEGMEN ENERGY L (btu) 6977.0 | ю | | | | FUEL MAINING gal.) 38.90 | FUEL ECONOMY (mpg) |
| SPEED TORGUE HORSEPOWER SPEED TORGUE HORSEPOWER (FPM) (ft-1b) (hp) (ft-1b) (| | | *** | ELECT | u l | 1 | * * * * | | | |
| SPEED COMER SPEED COMER SPEED TORGUE HORSEPOWER SPEED TORGUE HORSEPOWER SPEED TORGUE HORSEPOWER SPEED TORGUE HORSEPOWER CPM) (ft-lb) | ā | | GOTAGO | ZI | NER SPROCKET | MOTOR | OUTE | R SPROCKET | MOTOR | |
| BUSS CURRENT VOLTAGE CURRENT FIELD FOWER VOLTAGE CURRENT (amps) (Kw) (volts) (amps) 58312.26 9.91 29156.13 | 9 ~ | SPEED (rpm) | GENERALUR POWER (Kw) 578.15 | SPEED (rpm) 6609,84 | TORQUE (ft-1b) 283,38 | HORSEPOWER (hp) 356.64 | SPEED (rpm) 6609.84 | TORQUE (ft-1b) 283.38 | HORSEPOW (hp) | <u>r</u> |
| | | EUSS VOLTAGE (volts) 9.91 | BUSS CURRENT (amps) 58312,26 | VOLTAGE (volts) 9.91 | CURRENT (amps) 29156.13 | FIELD POWER (Kw) | VOLTAGE (volts) 9.91 | CURRENT (amps) 29156,13 | FIELD FO (KW 15.0 | DWER |

半半半半

| | ELECTRIC DRIVE TYPE | HoPol P-G | | RANGE ESTIMATE (miles) 155,44 | | and the first the state of the | NEI DKIVE EFFICIENCY (%) 69.49 | | FUEL ECONOMY (mpg) O.44 | | | JWER 19 | D POWER (Kw) |
|----------------|------------------------|--------------------|----------|--|-------------|--------------------------------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING | CONSTANT | | AVG. FORWARD VELOCITY (mph) 10.81 | | | TORQUE (ft-1b) 6431.04 | | FUEL REMAINING (gal.) 338.48 | | SPROCKET MOTOR | HORSEPOWER) (hp) 0 357.59 | FIEL |
| | SCH | 00 | | | *** | CKET | SPEED (rpm) 283.28 | | ED ; | | | TORQUE (ft-1b) 265.20 | CURRENT (amps) 27284.90 |
| *** | ENGINE | AD-1000 | * * * | CUMMULATIVE TIME (sec) 820.02 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 346.87 | **** | FUEL CONSUMED (gal.) 0.426 | 本学卡 | OUTER | SPEED (rpm) 7081.97 | VOLTAGE (volts) 10.62 |
| PARAMETERS | VEHICLE | 40 TON | E DATA | CUMMULATIVE DISTANCE (ft) 13000 | ANCE DATA | | TORQUE HORS (ft-1b) 6431.04 34 | GY DATA | FUEL CONSUMPTION (16/hr) 399.22 | E DATA | JR. | HORSEPOWER (hp) 357.59 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. | 05.0 | A COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED (rpm) 283.28 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | IC DRIVE | INNER SPROCKET MOTOR | TORQUE HO (ft-1b) 265.20 | CURKENT F (amps) 27284.90 |
| MISSIM | MAX. VELOCITY | 46.00 | MISSION | GRADE RADIUS (%) (ft) 9.38 0 | VEHICLE F | INNER | HORSEPOWER (hp) 346.87 | ENGINE | SEGMENT ENERGY LOSS (btu) 6524.92 | ELECTRIC | INNER | SPEED (rpm) (7081.97 | VOLTAGE (volts) (10.62 27 |
| * * * | SURFACE | COMPACTED SOIL | ** | DISTANCE GR(ft) (7 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * | CUMMULATIVE ENERGY USED (btu) 577913.30 | * * * * | | GENERATOR FOWER (KW) S79.69 | BUSS CURRENT (amps) 54569,79 |
| | | | | SEGMENT NO. (#) | | | TRACTIVE EFFORT (K-1bs) 11.56 | | SEGMENT ENERGY (btu) 21383.92 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 10.62 |
| | COURSE | DATA INPUT BY USER | | LAP NG. SE (#) | | | FORWARD VELOCITY (mph) 22.50 | -179 | HORSEPOWER GENERATED (hp) 998.37 · | | | 9E 10 | |

| | ELECTRIC DRIVE TYPE HOPO1 P-G | | FANGE ESTIMATE (miles) 165.81 | | | NEI DRIVE EFFICIENCY (%) 69.49 | | FUEL ECONOMY (mpg) 0.47 | | | 요 . | DWER O |
|------------|-------------------------------------|----------|--|-----------------|-----------|---|----------|--|----------|---|--------------------------------------|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | AVG, FORWARD VELOCITY (mph) 11.26 | | | TORQUE (ft-1b) 6028.78 | | FUEL REMAINING (gal.) 338.08 | | SPROCKET MOTOR | HORSEPOWER (hp) 357,58 | FIELD FOWER (KW) 15.0 |
| | SCHE | | | *** | SPROCKET | SPEED (rpm) 302.16 | ds. | YED 30 | | ER SPROCK | TORQUE (ft-1b) 248.61 | CURRENT (amps) 25578.27 |
| * * * | ENGINE | ** | CUMMULATIVE TIME (sec) 848.43 | 1 | OUTER SPR | HORSEPOWER (hp) 346.85 | * * * * | FUEL CONSUMED (gal.) | * * * | OUTER | SPEED (rpm) 7554.10 | VOLTAGE (volts) 11.33 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 14000 | AANCE DATA | | TORQUE HORS (ft-1b) 6028.78 3 | чау рата | FUEL CONSUMPTION (1b/hr) 399.19 | ZE DATA | OR | HORSEPOWER (hp) 357.58 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) 0.50 | 1 COURSE | TIME (sec) 28.41 | PERFORMANCE | SPROCKET | SPEED (rpm) | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | SPROCKET MOTOR | TORQUE HO (ft-1b) 248.61 | CURRENT F (amps) 25578.27 |
| MISSION | MAX. VELOCITY (mph) 45.00 | MISSION | RADIUS (ft) | ICLE | INNER S | HORSEPOWER (hp) 346.85 | ENGINE | SEGMENT ENERGY LOSS (btu) 6116.87 | ELECTRIC | INNER | SPEED T (rpm) (| VOLTAGE CI (volts) (11.33 255 |
| *** | | 1 | GRADE (%) 8.45 | く下一 | | | - | ZD E | - | | | >~ |
| * | SURFACE | *** | DISTANCE (ft) 1000 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 597959,70 | *** | 1. C. C. C. C. C. C. C. C. C. C. C. C. C. | DENERHIUR POWER (Kw) 579.66 | BUSS CURRENT (amps) 51156.53 |
| | | | SEGMENT NO. (#) 14 | | | TRACTIVE EFFORT (K-1bs) 10.84 | | SEGMENT ENERGY (btu) 20046.46 | | | SPEED (rpm) | EUSS VOLTAGE (volts) 11.33 |
| | COURSE DATA INPUT BY USER | | LAP NO. SE (#) | | | FORWARD VELOCITY (mph) 24.00 | B-180 | HORSEPOWER GENERATED (hp) 998.32 | | i | 10, | |
| | | | | | | | | | | | | |

半半半半

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 175.86 | | | NEI DRIVE EFFICIENCY (%) 69.50 | | FUEL (mpg) 0.50 | | | DWER 14 | FIELD FOWER (Kw) 15.0 |
|------------|--------------------------------------|---------|--|-------------|----------------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING | | AVG. FORWARD VELOCITY (mph) 11.69 | | | TORQUE (ft-1b) 5683.37 | | FUEL REMAINING (gal.) 337.70 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 7 358.14 | |
| | SCHE CON | | | *** | SPROCKET | SPEED (rpm) 321.05 | ų. | L MED 77 | | ER SPROCI | TORQUE (ft-1b) 234.37 | CURRENT (amps) 24112.79 |
| *** | ENGINE AD-1000 | *** | CUMMULATIVE TIME (sec) 875.17 | 1 | OUTER SPR | HORSEPOWER (hp) 347.41 | * * * * | FUEL CONSUMED (gal.) 0.377 | * * * * | TUO | SPEED (rpm) 8026.23 | VOLTAGE (volts) 12.04 |
| PARAMETERS | VEHICLE 40 TON | SE DATA | CUMMULATIVE DISTANCE (ft) 15000 | MANCE DATA | | TORQUE HOR (ft-1b) 5683.37 3 | RGY DATA | FUEL CONSUMPTION (1b/hr) 399.91 | VE DATA | rok | HORSEPOWER (hp) 358.16 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | COURSE | TIME (sec) 26.74 | FERFORMANCE | PROCKET | SPEED (rpm) 321.05 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | SPROCKET MOTOR | TORQUE H (ft-1b) 234.37 | CURRENT (amps) 24112.79 |
| NOISSIM | MAX. VELUCITY (mph) 45.00 | MISSION | RADE RADIUS (%) (ft) 7.65 0 | VEHICLE F | INNER SPROCKET | HORSEPOWER (hp) 347.41 | ENGINE | SEGMENT ENERGY LOSS (btu) 5764.06 | ELECTRIC | INNER | SPEED T (rpm) (| VOLTAGE C (valts) (12.04 24 |
| **** | SURFACE COMPACTED SOIL | *** | DISTANCE GRADE (ft) (%) 1000 7.65 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * | CUMMULATIVE ENERGY USED (btu) 616855.30 | * * * * | | GENERALOR POWER (Kw) 580.60 | BUSS CURRENT (amps) 48225.57 |
| | | | SEGMENT NO. (#) 15 | | | TRACTIVE EFFORT (K-1bs) 10.22 | | SEGMENT ENERGY (btu) 18895.57 | | | GENERALUR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 12.04 |
| | COURSE DATA INPUT BY USER | | LAP NO. SE (#) 1 | | | FORWARD VELOCITY (mph) 8 25.50 | 181 | HORSEPOWER GENERATED (hp) 999.82 | | • | H 10 | |
| | | | | | | | | | ••. | | | 5 1 |

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 186.85 | | <u> </u> | NEI DRIVE EFFICIENCY (%) 69.48 | | FUEL ECONOMY (mpg) 0.53 | | | Œ | WER | |
|------------|--------------------------------------|--------|--|-------------|-----------|---|----------|--|----------|----------------|--------------------------------------|---------------------------------------|--|
| | ENGINE SCHEDULING I | | G. FORWARD VELOCITY (mph) 12.12 | | | TORQUE (ft-1b) 5351.01 | ٠ | FUEL REMAINING (gal.) 337.35 | | SPROCKET MOTOR | HORSEPOWER (hp) 357.05 | FIELD POWER (KW) 15.0 | |
| | SCHEL | | AV | ** | SPROCKET | SPEED (rpm) 339.93 | Ψ | | | | TarquE (ft-1b) 220.66 | CURRENT (amps) 22702.70 | |
| *** | ENGINE AD-1000 | ** | CUMMULATIVE TIME (sec) 900.42 | 1 | OUTER SPR | HORSEPOWER (hp) 346.34 | * * * | FUEL CONSUMED (gal.) 0.355 | * * * | OUTER | SPEED (rpm) 8498.34 | VOLTAGE (volts) 12.75 | |
| PARAMETERS | VEHICLE | E DATA | CUMMULATIVE DISTANCE (ft) 16000 | ANCE DATA | | TORQUE HORS (ft-1b) (5351.01 34 | GY DATA | FUEL CONSUMPTION (16/hr) 398.54 | E DATA | | HORSEPOWER (hp) 357.05 | FIELD FOWER (Kw) 15.0 | |
| | MAX. LAT. ACCEL. (g's) 0.50 | COURSE | . TIME (sec) 25.25 | FERFORMANCE | SPROCKET | SPEED T (rpm) (339.93 5 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | SPROCKET MOTOR | TORQUE HOR (ft-1b) | CURRENT F1. (amps) 22702.70 | |
| MOISSIM | MAX. VELOCITY (mph) 45.00 | MISSIM | каре каріus (%) (ft) 6.88 0 | VEHICLE F | INNER | HORSEPOWER (hp) 346.34 | ENGINE | SEGMENT ENERGY LOSS (btu) 5431.21 | ELECTRIC | INNER | SPEED T (rpm) (8498.36 | VOLTAGE C (volts) (| |
| * * * * | SURFACE | * * * | DISTANCE GRADE (ft) (%) 1000 6.88 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * | CUMMULATIVE ENERGY USED (btu) 634650.10 | * * * * | | GENERALOK POWER (Kw) 578.81 | BUSS CURRENT (amps) 45405.39 | |
| | USER 'OM | | SEGMENT NO. (#) 16 | | | TRACTIVE EFFORT (K-1bs) 9.62 | | SEGMENT ENERGY (btu) 17794.81 | | | SPEED (rpm) | BUSS VOLTAGE (volts) 12.75 | |
| | COURSE DATA INPUT BY L | | LAP NG. SE (#) 1 | | | FORWARD VELOCITY (mph) 8 27.00 | ·182 | HORSEPOWER GENERATED (hp) 996.96 | | į | 10, | | |

| | ELECTRIC DRIVE TYPE THOROI P-G | | RANGE ESTIMATE (miles) 196.75 | | 1 | NEI DRIVE EFFICIENCY (%) 69.49 | | FUEL ECONOMY (mpg) 0.56 | | | ដ | DWER O |
|------------|--------------------------------------|----------|--|-------------|---|---|----------|--|----------|----------------------|--------------------------------------|---------------------------------------|
| | ENGINE SCHEDULING | | AVG. FORWARD VELOCITY (mph) 12.55 | | | TORGUE (ft-1b) 5080.51 | | FUEL REMAINING (gal.) 337.01 | | OUTER SPROCKET MOTOR | HORSEPOWER (hp) 357.83 | FIELD POWER (Kw) 15.0 |
| | SCHE | | Ą | *** | SPROCKET | SPEED (rpm) 358.82 | | IED (77 | | SR SPROCK | TORQUE (ft-1b) 209.51 | CURRENT (amps) 21555,02 |
| * * * * | ENGINE AD-1000 | ** | CUMMULATIVE TIME (Sec) 924.34 | | OUTER SPRO | HORSEPOWER (hp) 347.10 | *** | FUEL CONSUMED (gal.) 0.337 | * * * * | DUTE | SPEED (rpm) 8970.49 | VOLTAGE (volts) 13.46 |
| PARAMETERS | VEHICLE 40 TON | E DATA | CUMMULATIVE DISTANCE (ft) | ANCE DATA | | TORQUE HOR((ft-1b) 5080.51 3 | ВУ ВАТА | FUEL CONSUMPTION (1b/hr) 399.51 | E DATA | R | HORSEPOWER (hp) 357.83 | FIELD FOWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | A COURSE | TIME (sec) 23.92 | PERFORMANCE | SPROCKET | SPEED 1 (rpm) (358.82 5 | / ENERGY | ENGINE SPEED (rpm) | IC DRIVE | INNER SPROCKET MOTOR | TORQUE HOR (+t-1b) 209.51 | CURRENT F1 (amps) 21555.02 |
| NISSIM | MAX. VELOCITY (mph) 45.00 | NOISSIM | RADE RADIUS (%) (ft) 6.25 0 | ICLE | INNER | HORSEPOWER (hp) 347.10 | ENGINE | SEGMENT ENERGY LOSS (btu) 5153.81 | ELECTRIC | INNE | SPEED (rpm) (8970.49 | VOLTAGE (volts) 13.46 21 |
| * * * | SURFACE COMPACTED SOIL | * * | DISTANCE GRADE (ft) (%) 1000 6.25 | 工山> **** | | ACELERATION (g's) | *** | CUMMULATIVE ENERGY USED (btu) 651542.50 | * * * * | | DENERHIUM POWER (Kw) 580.08 | BUSS CURRENT (amps) 43110.04 |
| | | | SEGMENT NO. (#) 17 | | | TRACIIVE EFFORT (K-lbs) 9.13 | | SEGMENT ENERGY (btu) 16892.40 | | | SPEED SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 13.46 |
| | COURSE DATA INPUT BY USER | | LAP NO. SI (#) | | | FORWARD VELOCITY (mph) 28.50 | 83 | HORSEPOWER GENERATED (hp) 998.98 | | į | 10 | |

本本本本 ELECTRIC DRIV. PERFORMANCE 本本本本

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 207.25 | | | NET DRIVE EFFICIENCY (%) 69.49 | | FUEL ECONOMY (mpg) 0.59 | | | | ER |
|------------|--------------------------------------|---------|--|-------------|-----------|---|----------|--|----------|--|---------------------------------------|---------------------------------------|
| | ENGINE B SCHEDULING DF | | AVG. FORWARD VELOCITY (mph) 12.96 · | | | TORQUE (ft-1b) 4823.40 | | FUEL REMAINING (gal.) 336.69 | | SPROCKET MOTOR | HORSEPOWER (hp) | FIELD POWER (Kw) 15.0 |
| | SCHE | | | *** | SPROCKET | SPEED (rpm) 377.71 | ı. | | | | TORQUE (ft-1b) 198.90 | CURRENT (amps) 20464.20 |
| *** | ENGINE AD-1000 | *** | CUMMULATIVE TIME (sec) 947.07 | 1 | OUTER SPR | HORSEPOWER (hp) 346.88 | *** | FUEL CONSUMED (gal.) 0.320 | *** | OUTER | SPEED (rpm) 9442.63 | VOLTAGE (volts) 14.16 |
| PARAMETERS | VEHICLE | E DATA | CUMMULATIVE DISTANCE (ft) 18000 | ANCE DATA | | TORQUE HOR((ft-1b) 4823.40 34 | 3Y DATA | FUEL CONSUMPTION (1b/hr) 399,23 | E DATA | ~ | HORSEPOWER (hp) 357.60 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED TC (rpm) (4 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | INNER SPROCKET MOTOR | TORGUE HORS (ft-1b) (198.90 35 | CURRENT FIE (amps) 20464.20 |
| NOISSIM | MAX. VELOCITY (mph) 45.00 | MISSION | E RADIUS (+t) 5 0 | ICLE | INNER S | HORSEPOWER (hp) 346.88 | ENGINE | SEGMENT ENERGY LOSS (btu) 4893.78 | ELECTRIC | INNER | SPEED TC (+ 9442,63 | VOLTAGE CL (volts) (≥ 14.16 204 |
| **** | SURFACE | **** | DISTANCE GRADE (4t) (%) 1000 5.65 | 1日2 **** | | ACCELERATION (g's) | *** | CUMMULATIVE ENERGY USED (btu) 667580.80 | *** | CONTRACTOR | POWER (KW) 579.71 | BUSS CURRENT (amps) 40928.39 |
| | | | SEGMENT NG. (#) 18 | | | RACIIVE EFFORT (K-1bs) 8.67 | | SEGMENT ENERGY (btu) 16038.31 | | , 00 CF 00 C | SPEED (rpm) | BUSS VOLTAGE (volts) 14.16 |
| | COURSE DATA INPUT BY USER | | LAP NO. (#) 1 | | | LUKWARD . VELOCITY (mph) 30.00 | | HORSEPOWER GENERATED (hp) 998.39 | | ű | 01 | |
| | | | | | | D-194 | • | | | | | |

| | ELECTRIC DRIVE TYPE | Hafal F-6 | | RANGE ESTIMATE (miles) 217.88 | | PUT OUT | EFFICIENCY (%) | | FUEL ECONOMY (mpg) 0.62 | | | OWER) 21 | FIELD POWER (Kw) 15.0 |
|------------|------------------------|--------------------|----------|--|-------------|------------|---|----------|--|----------|----------------|---|---------------------------------------|
| | ENGINE SCHEDULING | CONSTANT | | AVG. FORWARD VELOCITY (mph) 13.38 | | | TORQUE (ft-1b) 4588.63 | | FUEL REMAINING (gal.) 336.39 | | SPROCKET MOTOR | HORSEPOWER (hp) 357.21 | |
| | SCHEI | CON | | | * * * | SPROCKET | SPEED (rpm) 396.59 | | | | | TORQUE (ft-1b) 189,22 | CURRENT (amps) 19468.13 |
| * * * * | ENGINE | AD-1000 | *** | CUMMULATIVE TIME (sec) 968.72 | I | OUTER SPRO | HORSEPOWER (hp) 346.49 | * * * * | FUEL CONSUMED (gal.) 0.304 | *** | OUTER | SPEED (rpm) 9914.77 | VOLTAGE (volts) 14.87 |
| PARAMETERS | VEHICLE | 40 TON | E DATA | CUMMULATIVE DISTANCE (ft) 19000 | ANCE DATA | | TORQUE HOR9 (ft-1b) 4588.63 34 | GY DATA | FUEL CONSUMPTION (1b/hr) 398.74 | VE DATA | OR | HORSEFOWER (hp) 357.21 | FIELD POWER (Kw) 15.0 |
| 1 | MAX. LAT. ACCEL. | (8.8) 0.50 | A COURSE | TIME (sec) 21.64 | PERFORMANCE | SPROCKET | SPEED (rpm) 396.59 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | DRI | SPROCKET MOTOR | TORQUE HO (ft-1b) 189.22 | CURRENT F (amps) 19468.13 |
| NOISSIM | MAX. VELOCITY | (mph) 45.00 | MISSIM | RADE RADIUS (%) (ft) 5.1 0 | VEHICLE | INNER | HORSEPOWER (hp) 346.49 | ENGINE | SEGMENT ENERGY LOSS (btu) 4656.88 | ELECTRIC | INNER | SPEED (rpm) 9914.77 | VOLTAGE (volts) 14.87 |
| * * * * | SURFACE | COMPACTED SOIL | * * * | DISTANCE GRADE (ft) (%) 1000 5.1 | **** | | LATERAL ACCELERATION (g's) 0.000 | *** | CUMMULATIVE ENERGY USED (btu) 682839.70 | *** | | GENERATOR POWER (Kw) S79.07 | BUSS CURRENT (amps) 38936.25 |
| | | | | SEGMENT NO. (#) 19 | | | TRACTIVE EFFORT (K-1bs) 8.25 | | SEGMENT ENERGY (btu) 15258.97 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 14.87 |
| | COURSE | DATA INPUT BY USER | | LAP NO. S (#) | | | FORWARD VELOCITY (mph) 31.50 | B-185 | HORSEPOWER GENERATED (hp) 997.37 | | | 95 21 | |

| | ELECTRIC DRIVE TYPE HOPOl P-G | | RANGE ESTIMATE (miles) 227.71 | | | NET DRIVE EFFICIENCY (%) 69.49 | | FUEL ECONOMY (mpg) 0.65 | | | œ | WER |
|------------|--------------------------------------|---------|--|-------------|----------------|---|----------|--|----------|----------------------|--------------------------------------|---------------------------------------|
| | ENGINE SCHEDULING I | | G. FORWARD VELOCITY (mph) 13.79 | | | TORQUE (ft-1b) 4389.58 | | FUEL REMAINING (gal.) 336.09 | | ET MOTOR | HORSEPOWER (hp) 357.98 | FIELD POWER (Kw) 15.0 |
| | SCHE | | AV | * | CKET | SPEED (rpm) 415.48 | | | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 181.01 | CURRENT (amps) 18623,63 |
| ** | ENGINE AD-1000 | * * * * | CUMMULATIVE TIME (sec) 989.38 | **** 4 | OUTER SPROCKET | | * * * | FUEL CONSUMED (gal.) 0.291 | * * * | OUTE | SPEED (rpm) 10386.90 | VOLTAGE (volts) 15.58 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 20000 | IANCE DATA | | TORQUE HOR9 (ft-1b) | GY DATA | FUEL CONSUMPTION (16/hr) 399,70 | VE DATA | R | HORSEPOWER (hp) 357.98 | FIELD POWER (Kw) 15.0 |
| | MAX, LAT. ACCEL. (g's) 0.50 | COURSE | TIME (sec) 20.66 | FERFORMANCE | INNER SPROCKET | 0 | / ENERGY | ENGINE SPEED (rpm) | DRI | SPROCKET MOTOR | TORQUE HOR (ft-1b) | CURRENT F) (amps) 18623.63 |
| MOISSIM | MAX. VELOCITY (mph) 45.00 | NOISSIM | RADE RADIUS (%) (ft) 4.63 0 | VEHICLE | INNER | HORSEPOWER (hp) 347.25 | ENGINE | SEGMENT ENERGY LOSS (btu) 4452.44 | ELECTRIC | INNER | SPEED TI (rpm) (- | VOLTAGE CO (volts) (15.58 18 |
| * * * | SURFACE COMPACTED SOIL | *** | DISTANCE GRADE (%) (%) 1000 4.63 | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 697434.30 | *** | | GENERALOR FOWER (Kw) 580.33 | BUSS CURRENT (amps) 37247.27 |
| | USER COM | | SEGMENT NO. (#) 20 | | | TRACTIVE EFFORT (K-1bs) 7.89 | | SEGMENT ENERGY (btu) 14594.63 | | | SPEED (rpm) | RUSS VOLTAGE (volts) 15.58 |
| | COURSE DATA INFUT BY I | | LAF NO. Si (#) | | | FORWARD VELOCITY (mph) 33.00 | ·186 | HORSEPOWER GENERATED (hp) | | í | , oi | |

| | ELECTRIC DRIVE TYPE | HoPal P-6 | | RANGE ESTIMATE (miles) 238,27 | | 111111111111111111111111111111111111111 | NEI DRIVE EFFICIENCY (%) 69.49 | | FUEL ECONOMY (mpg) 0.68 | | | WER 9 | D POWER (KW) |
|------------|------------------------|--------------------|--------|--|-------------|---|---|------------------|--|----------|----------------------|---|---------------------|
| | ENGINE SCHEDULING | CONSTANT | | G. FORWARD VELOCITY (mph) 14.19 | | | TORQUE (ft-1b) | | FUEL REMAINING (gal.) 335.82 | | ET MOTOR | HORSEPOWER (hp) 357.69 | FIEL |
| | SCHEI | CON | | A | *** | SPROCKET | SPEED (rpm) 434.36 | | | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 173.00 | CURRENT (amps) |
| *** | ENGINE | AD-1000 | ** | CUMMULATIVE TIME (Sec) 1009.14 | 1 | OUTER SPRO | HORSEPOWER (hp) 346.96 | * * * * | FUEL CONSUMED (gal.) | * * * * | OUTE | SPEED (rpm) 10859.04 | VOLTAGE (volts) |
| FARAMETERS | VEHICLE | 40 TON | E DATA | CUMMULATIVE DISTANCE (ft) 21000 | ANCE DATA | | TORQUE HOR (ft-1b) 4195.27 3 | GY DATA | FUEL CONSUMPTION (1b/hr) 399.33 | VE DATA | K | HORSEPOWER (hp) 357.69 | FIELD POWER (Kw) |
| 1 | MAX. LAT. | (g's) 0.50 | COURSE | TIME (Sec) | PERFORMANCE | SPROCKET | SPEED T (rpm) (434.36 4 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIV | SPROCKET MOTOR | TORQUE HOR (ft-1b) | CURRENT FI |
| MOISSIM | MAX. VELOCITY | (mph) 45.00 | SSION | RADIUS (ft) 0 | | INNER SPR | HORSEPOWER (hp) 346.96 | ENGINE | SEGMENT ENERGY LOSS (btu) 4256.23 | ELECTRIC | INNER SF | SPEED TOR (rpm) (ft 10859.04 17 | VOLTAGE CUR |
| t | | | MIS | GRADE (%) | VEHIC | | HOH | - 1 | | | | 106 | 5 |
| * + + + | SURFACE | COMPACTED SOIL | ** | DISTANCE (ft) 1000 | *** | | LATERAL ACCELERATION (g's) 0.000 | 字 字 宋·孝 | CUMMULATIVE ENERGY USED (btu) 711383.80 | * * * * | | GENERATOR POWER (KW) 579.85 | BUSS CURRENT |
| | | | | SEGMENT NO. (#) 21 | | | TRACTIVE EFFORT (K-1bs) 7.54 | | SEGMENT ENERGY (btu) 13949.47 | | | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE |
| | COURSE | DATA INPUT BY USER | | LAP NO. S (#) | | | FORWARD VELOCITY (mph) 9 34.50 | -187 | HORSEPOWER GENERATED (hp) 998.61 | | | GE 10 | |

本事事事 PERFORMANCE ELECTRIC DRIV 本本本本

| | ELECTRIC DRIVE TYPE HOPOI P-G | | RANGE ESTIMATE (miles) 248,73 | | 1 | NEI DRIVE EFFICIENCY (%) 69.49 | | FUEL ECGNOMY (mpg) 0.71 | | | ER | OWER O | |
|------------|--------------------------------------|----------|--|-------------|----------------|---|----------|--|----------|---|--------------------------------|---------------------------------------|--|
| | ENGINE SCHEDULING | | AVB, FORWARD VELOCITY (mph) | | | TORQUE (ft-1b) 4019.05 | | FUEL REMAINING (gal.) 335.55 | | SPROCKET MOTOR | HORSEFOWER (hp) | FIELD POWER (KW) 15.0 | |
| | 900H | | | * * * * | COCKET | SPEED (rpm) 453.25 | * | il. IMED I.) | | OUTER SPROCK | TORQUE (ft-1b) 165.73 | CURRENT (amps) 17051.60 | |
| * * * * | ENGINE AD-1000 | * * * | CUMMULATIVE TIME (sec) 1028.08 | DATA *: | OUTER SPROCKET | HORSEPOWER (hp) 346.84 | *** | FUEL CONSUMED (gal.) 0.267 | *** | TUO | SPEED (rpm) 11331.17 | VOLTAGE (volts) 17.00 | |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 22000 | | | TORGUE HOR (ft-1b) 4019.05 | GY DATA | FUEL CONSUMPTION (1b/hr) 399.18 | JE DATA | OR | HORSEPOWER (hp) 357.56 | FIELD POWER (Kw) 15.0 | |
| 1 | MAX, LAT, ACCEL. (g's) 0.50 | A COURSE | TIME (SEC) | PERFORMANCE | SPROCKET | SPEED (rpm) 453.25 | / ENERGY | ENGINE SPEED (rpm) | C DRIVE | SPROCKET MOTOR | TORQUE HO (ft-1b) 165.73 | CURRENT F (amps) | |
| MISSION | MAX. VELOCITY (mph) 45.00 | MISSION | E RADIUS (ft) 5 0 | VEHICLE F | INNERS | HORSEFOWER (hp) 346.84 | ENGINE | SEGMENT ENERGY LOSS (btu) 4077.81 | ELECTRIC | INNER | SPEED T (rpm) (| VOLTAGE CI (volts) (17.00 17 | |
| * * * * | SURFACE | *** | DISTANCE GRADE (ft) (%) 1000 3.75 | 当 **** | | ACCELERATION (g's) | *** | CUMMULATIVE ENERGY USED (btu) 724747.60 | *** | ים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים בי מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים מילים ביים | | BUSS CURRENT (amps) 34103.20 | |
| | | | SEGMENT NO. (#) 22 | | | TRACTIVE EFFORT (K-1bs) 7.22 | | SEGMENT ENERGY (btu) 13363.89 | | | SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 17.00 | |
| | COURSE DATA INPUT BY USER | | LAP NO. SE (#) | | | FORWARD VELOCITY (mph) 36.00 | 188 | HORSEPOWER GENERATED (hp) 998.29 | | į | 107 | <i>y</i> - | |
| | | | | | | D- | 100 | | | | | | |

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 258.57 | | | NEI DAIVE EFFICIENCY (%) 69.50 | | FUEL ECONOMY (mpg) 0.74 | | | DWER) 22 | FIELD POWER (Kw) 15.0 |
|----------------|-------------------------------------|---------|--|------------------|----------------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | AVG. FORWARD VELOCITY (mph) 15.00 | | | TORQUE (ft-1b) 3865.40 | | FUEL REMAINING (gal.) 335.29 | | OUTER SPROCKET MOTOR | HORSEPOWER) (hp) o 358.22 | |
| | SCHI | | | * | DKET | SPEED (rpm) 472.13 | | ED) | | R SPROC | TORQUE (ft-1b) 159.40 | CURRENT (amps) 16399.69 |
| 常本常常 | ENGINE | * * * | CUMMULATIVE TIME (sec) 1046.26 | **** ** | OUTER SPROCKET | HDRSEPOWER (hp) 347.48 | *** | FUEL CONSUMED (gal.) | *** | DUTE | SPEED (rpm) 11803.30 | VOLTAGE (volts) 17.70 |
| PARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 23000 | PERFORMANCE DATA | | TORQUE HDR8 (ft-1b) 3865,40 : 3 | SGY DATA | FUEL CONSUMPTION (1b/hr) 399.99 | JE DATA | 90. | HORSEPOWER (hp) 358,22 | FIELD FOWER (Kw) 15.0 |
| PARA | MAX. LAT ACCEL. (g's) 0.50 | COURSE | TIME (sec) 18.18 | FOR | ŒŦ | SPEED (rpm) 472.13 | ENERGY | ENGINE SPEED (rpm) 3200.00 | DRIVE | INNER SPROCKET MOTOR | ~0 | |
| Z | | | | THE | SPROCKET | SPE (r) 473 | | | Z.C | R SPRO | TORQUE (ft-1b) 159.40 | CURRENT (amps) 16399.69 |
| MISSION | MAX. VELOCITY (mph) 45.00 | NOISSI | RADIUS (ft) O | ICLE | INNER | HORSEFOWER (hp) 347.48 | ENGINE | SEGMENT ENERGY LOSS (btu) 3920.10 | ELECTRIC | INNE | SPEED (rpm) 11803.30 | VOLTAGE (volts) 17.70 |
| | | Σ | GRADE (%) 3.38 | VEH I | | 모 | | ш | 1 | | 11 | > 2 |
| * * * | SURFACE COMPACTED SOIL | * * * | DISTANCE (ft) 1000 | * * * * | | LATERAL ACCELERATION (g´s) O.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 737598.80 | *** | | SENERAIUR POWER (KW) 580.71 | BUSS CURRENT (amps) 32799.37 |
| | | | SEGMENT NO. (#) 23 | | | TRACTIVE EFFORT (K-1bs) 6.95 | | SEGMENT ENERGY (btu) 12851.15 | | | GENERATUR SPEED (rpm) 10400.00 | BUSS VOLTAGE (valts) 17.70 |
| | COURSE DATA INPUT BY USER | | LAF NO. (#) | | | FORWARD VELOCITY (mph) 37.50 | -189 | HORSEPOWER GENERATED (hp) 999.99 | | | | |

| COUNTREE CORPEACED SOIL CORPEACE CORPEACED SOIL | | | | İ | | | | | ķ | | |
|--|--|-------------------------------------|---|------------------------------------|-------------------------|-------------------------------------|--|-------------------------------|----------------------------------|---|---|
| A | COURSE | | SURFACE | MAX | \\ }!! | MAX. LAT ACCEL. | | | | ENGINE HEDULING | ELECTRIC DRIVE TYPE |
| ### PID: SECHENT NO. DISTANCE GRADE RADIUS TINE CUMPLICATIVE TOWNL | DATA INPUT | BY USER | COMPACTED SOIL | (mp) 45.0 | 2 S | (g's) 0.50 | 40 TON | AD-10 | 1 | NSTANT | HoPol P-G |
| PRINCE SEGNENT NO. DISTANCE SKADE RADIUS TIME DISTANCE CARD C | | | *** | H | NOH | COURS | 1 | 1 | * | | |
| TRACTIVE LATERAL TOWER SPROCKET COUTER COUTER SPROCKET COUTER SPROCKET COUTER SPROCKET COUTER COUTER SPROCKET COUTER COUTER SPROCKET COUTER | LAP ND. (#) | SEGMENT NI (#) 24 | DISTANCE (ft) 1000 | | DIUS ft) | TIME (sec) 17.48 | CUMMULATIVE DISTANCE (ft) 24000 | | | NG. FORWARD VELOCITY (mph) 15.39 | RANGE ESTIMATE (miles) 269.64 |
| TRACTIVE | | | | VEHICL | | RFOR | | 1 | 米米米米 | | |
| Chapter Chap | | | | N. | | OKET | | | SPROCKET | | |
| HORSEPOWER SEGMENT CUMMULATIVE SEGMENT CRONS. DATA **** HORSEPOWER SEGMENT CUMMULATIVE SEGMENT CRONS. DATA **** HORSEPOWER SEGMENT CLOUNDED CONS. DATA (PAL) (PA | VELOCITY (mph) | EFFORT (K-1bs 6.66 | | - HORSEFOW (hp) 346.63 | | | | HORSEPOWER. (hp) 346.63 | SPEED (rpm) 491.02 | TORQUE (ft—1b) 3707.67 | NEI DKIVE EFFICIENCY (%) 69.48 |
| SEGMENT ENGENE FUEL | 190 | | * * * | I | | 1 | | | * | | |
| # # # # ELECTRIC DRIVE DATA * # # # # # # # # # # # # # # # # # # | HORSEPOW GENERATE (hp) 997.74 | 1. G | - | SEGME ENERGY (btu 3762. | .NT LCOSS) 44 | ENGINE SPEED (rpm) 3200.00 | FUEL CONSUMPT (1b/hr 398.91 | | -uEL ASUMED 1a1.) 7.246 | FUEL REMAINING (gal.) 335.05 | FUEL ECONOMY (mpg) |
| SPEED TORQUE HORSEPOWER SPEED TORQUE HORSEPOWER SPEED TORQUE HORSEPOWER SPEED TORQUE HORSEPOWER (rpm) (ft-1b | | | * * * | | TRIC | ! | | i | * | | |
| SPEED TORQUE HORSEPOWER SPEE | | | ָרָ בְּיִלְיִלְיִילְיִילְיִילְיִילְיִילְיִילְ | Ħ | NNER SPR | OCKET MOT | OR | J | JUTER SPROC | KET MOTOR | |
| BUSS CURRENT VOLTAGE CURRENT FIELD FOWER VOLTAGE CURRENT (amps) (volts) (amps) (KW) (volts) (amps) 31461.01 18.41 15730.50 | | SPEED (rpm) 10400.00 | GENERHIUR POWER (Kw) 579.30 | SPEED (rpm) 12275.43 | - ` | ~ 6 | RSEPOWER (hp) | SPEED (rpm) 12275.47 | - | HORSEPOWER (hp) | JER S |
| | | EUSS VOLTAGE (volts) 18.41 | BUSS CURRENT (amps) 31461.01 | VOLTAGE (volts) 18.41 | CURR (amp | | IELD POWER (Kw) 15.0 | VOLTAGE (valts) 18.41 | CURREN (amps) 15730.5 | T FIELD POWER (Kw) | OWER O |

| | ELECTRIC DRIVE TYPE | | RANGE ESTIMATE (miles) 279.82 | | FULL CO. | NEI DRIVE EFFICIENCY (%) 69.49 | | FUEL ECONOMY (mpg) o.80 | | | OWER 57 | FIELD POWER (Kw) 15.0 |
|------------|--------------------------------------|----------|--|-------------|----------------|---|----------|--|----------|----------------------|---|---------------------------------------|
| | ENGINE SCHEDULING | | AVG. FORWARD VELOCITY (mph) 15.78 | | | TORQUE (ft-1b) 3572.56 | | FUEL REMAINING (gal.) 334.81 | | SPROCKET MOTOR | HORSEPOWER (hp) 357.57 | |
| | SCHE | | AV | *** | CKET | SPEED (rpm) 509.90 | | | | | TORQUE (ft-1b) 147.32 | CURRENT (amps) 15157.25 |
| * * * | ENGINE AD-1000 | ** | CUMMULATIVE TIME (sec) 1080.58 | ١ | OUTER SPROCKET | HORSEPOWER (hp) 346.84 | *** | FUEL CONSUMED (gal.) 0.237 | *** | OUTER | SPEED (rpm) 12747.56 | VOLTAGE (volts) 19.12 |
| PARAMETERS | VEHICLE 40 TON | E DATA | CUMMULATIVE DISTANCE (ft) . 25000 | ANCE DATA | | TORQUE HOR (ft-1b) 3572.56 3 | GY DATA | FUEL CONSUMPTION (1b/hr) 399.19 | E DATA | Ľ | HORSEPOWER (hp) 357.57 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT. ACCEL. (g's) 0.50 | A COURSE | TIME (sec) 16.83 | PERFORMANCE | SPROCKET | SPEED T (rpm) (509.90 3 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | IC DRIVE | INNER SPROCKET MOTOR | TORQUE HOR (ft-1b) | CURRENT FI (amps) 15157.25 |
| NOISSIW | MAX. VELOCITY (mph) 45.00 | MISSION | GRADE RADIUS (%) (ft) 2.67 0 | VEHICLE | INNER | HORSEPOWER (hp) 346.84 | ENGINE | SEGMENT ENERGY LOSS (btu) 3624.77 | ELECTRIC | INNER | SPEED 1 (rpm) 12747.56 | VOLTAGE (volts) 19.12 |
| *** | SURFACE | * * * | DISTANCE GR((ft) (7 1000 2. | *** | | LATERAL ACCELERATION (g's) 0.000 | * * * | CUMMULATIVE ENEKGY USED (btu) 761807.00 | * * * * | | GENERATOR POWER (Kw) 579.65 | BUSS CURRENT (amps) 30314.50 |
| | | | SEGMENT NO. (#) 25 | | ! | TRACTIVE EFFORT (K-1bs) 6.42 | | SEGMENT ENERGY (btu) 11879.21 | | 1 | GENERATOR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 19.12 |
| | . COURSE DATA INPUT BY USER | | LAP.NO. S (#) | | | FORWARD VELOCITY (mph) 40.50 | s-191 | HORSEPOWER GENERATED (hp) 998,30 | | | 9E 3E | |

| | ENGINE ELECTRIC SCHEDULING DRIVE TYPE | CONSTANT HOPOI P-G | | AVG. FORWARD RANGE VELOCITY ESTIMATE (mph) (miles) 16.17 289.60 | | | NET DRIVE TORQUE EFFICIENCY (ft-1b) (%) 3451.18 69.50 | | FUEL FUEL REMAINING ECDNOMY (gal.) (mpg) 334.58 0.83 | | IT MOTOR | HORGEPOWER (hp) 358.21 | FIELD POWER (Kw) |
|------------|--|--------------------|----------|---|--------------------|----------|--|-------------|--|----------|--|--------------------------------------|----------------------------|
| ů. | |] | ılı. | Ą | 京年半年 | SPROCKET | SPEED (rpm) 528.79 | * | FUEL CONSUMED (gal.) 0.229 | | OUTER SPROCKET MOTOR | TORQUE (ft-1b) 142.32 | CURRENT (amps) |
| * * * * | ENGINE | AD-1000 | *** | CUMMULATIVE TIME (sec) 1096.81 | DATA * | OUTER SP | HORSEFOWER (hp) 347.47 | *** | | *** | 0 | SPEED (rpm) 13219.69 | VOLTAGE (valts) |
| PARAMETERS | IT. VEHICLE | 40 TON | SE DATA | CUMMULATIVE DISTANCE (ft) 26000 | [| | TORQUE HO (+t-1b) 3451.18 | ENERGY DATA | FUEL CONSUMPTION (1b/hr) 399.98 | VE DATA | TOR | HORSEPOWER (hp) 358.21 | FIELD POWER (KW) |
| | MAX. LAT ACCEL. | (g s) 0.50 | N COURSE | TIME (sec) | FERFORMANCE | SPROCKET | SPEED (rpm) 528.79 | / ENE | ENGINE SPEED (rpm) 3200.00 | IC DRIVE | SPROCKET MOTOR | TORGUE H (ft-1b) 142.32 | CURRENT (amps) |
| NOISSIM | MAX. VELOCITY | (mph) 45.00 | MISSION | GRADE RADIUS (%) (ft) 2.37 0 | VEHICLE | INNER | HORSEPOWER (hp) 347.47 | ENGINE | SEGMENT ENERGY LOSS (btu) 3500.03 | ELECTR | INNER | SPEED T (rpm) (| VOLTAGE C (volts) (|
| * * * | SURFACE | COMPACTED SOIL | * * * | DISTANCE GF (ft) (1000 | > * * * | | LATERAL ACCELERATION (g's) O.000 | *** | CUMMULATIVE ENERGY USED (btu) 773281.00 | * * * * | COLVOLINGO | GENERALUR POWER (Kw) 580.70 | BUSS CURRENT (amps) |
| | | | | SEGMENT ND. (#) 26 | | | RACTIVE EFFORT (K-1bs) 6.20 | | SEGMENT ENERGY (btu) 11474.03 | | 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | SFEED (rpm) | BUSS VOLTAGE (volts) |
| | COURSE | DATA INPUT BY USER | | LAP NO. S (#) | | | FURWARD VELOCITY (mph) 42.00 | 192 | HORSEPOWER GENERATED (hp) 999.97 | | ū | , t | |

半半半半

| | ELECTRIC DRIVE TYPE + | | RANGE ESTIMATE (miles) 300.59 | | | NEI DKIVE EFFICIENCY (%) 69.49 | | FUEL ECONOMY (mpg) 0.86 | | | WER 3 | D FOWER (Kw) 15.0 |
|------------|--------------------------------------|----------|--|---|----------------|---|-----------|--|----------|--|---|---------------------------------------|
| | ENGINE SCHEDULING CONSTANT | | AVG. FORWARD VELOCITY (mph) 16.54 | | | TORQUE (ft-1b) 3325.76 | | FUEL REMAINING (gal.) 334.36 | | SPROCKET MOTOR | HORSEPOWER (hp) 4 357.53 | FIEL |
| | SCHE | | | *** | CKET | SPEED (rpm) 547.67 | | ED St | | SR SPROCH | TORQUE (ft-1b) 137.14 | CURRENT (amps) 14110.18 |
| *** | ENGINE AD-1000 | * * * | CUMMULATIVE TIME (sec) 1112.49 | 1 | OUTER SPROCKET | HORSEPOWER (hp) 346.80 | * * * * - | FUEL CONSUMED (gal.) 0.221 | | OUTER | SPEED (rpm) 13691.81 | VOLTAGE (volts) 20.54 |
| FARAMETERS | VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 27000 | ANCE DATA | | TORQUE HOR (ft-1b) 3325.76 3 | GY DATA | FUEL CONSUMPTION (1b/hr) 399,13 | JE DATA | DR | HORSEPOWER (hp) 357.53 | FIELD POWER (Kw) 15.0 |
| 1 | MAX. LAT. ACCEL. (g's) 0.50 | A COURSE | TIME (sec) | PERFORMANCE | SPROCKET | SPEED (rpm) 547.67 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | SPROCKET MOTOR | TORQUE HO (ft-1b) | CURRENT F (amps) |
| MISSION | MAX. VELOCITY (mph) 45.00 | MISSION | FRADE RADIUS (%) (+t) 0 | ICLE | INNERS | HORSEPOWER (hp) 346.80 | ENGINE | SEGMENT ENERGY LOSS (btu) 3374.47 | ELECTRIC | INNER | SPEED T (rpm) (13691.81 | VOLTAGE C (valts) (|
| * * * | SURFACE COMPACTED SOIL | * * * | DISTANCE GRADE (ft) (%) 1000 2.06 | エ山く・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ | | LAIERAL ACCELERATION (g's) 0.000 | ***** | CUMMULATIVE ENERGY USED (btu) 784339.70 | 李本本本 | المادة المدالة المادة ا | GENERATOR POWER (Kw) 579.58 | BUSS CURRENT (amps) 28220.36 |
| | | | SEGMENT NO. (#) 27 | | | TRACTIVE EFFORT (K-1bs) 5.98 | | SEGMENT ENERGY (btu) 11058,69 | | | GENERALUR SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 20.54 |
| | COURSE DATA INPUT BY USER | | LAF NO. S (#) | | | FORWARD VELOCITY (mph) 43.50 | -193 | HORSEPOWER GENERATED (hp) 998.19 | | Č | | |

| | ELECTRIC DRIVE TYPE HOPO1 P-G | | RANGE ESTIMATE (miles) 312.47 | | 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - | NEI DKIVE EFFICIENCY (%) 69.46 | | FUEL ECONOMY (mpg) 0.89 | | | WER 15 | D POWER (Kw) 15.0 |
|------------|-------------------------------------|---------|--|-------------|---|---|----------|--|----------|----------------|--------------------------------------|---------------------------------------|
| | SCHEDUL ING | | AVG. FORWARD VELOCITY (mph) 16.94 | | | TORQUE (ft—1b) 3200.76 | | FUEL REMAINING (gal.) 334.15 | | SPROCKET MOTOR | HORSEPOWER (hp) 355.95 | FIE |
| | SCH | | | *** | OCKET | SPEED (rpm) 566.56 | ¥ | IL IMED 1.2 | | OUTER SPROC | TORQUE (ft-1b) 131.99 | CURRENT (amps) 13579,82 |
| * * * | ENGINE AD-1000 | * * * | CUMMULATIVE TIME (sec) 1127.64 | 1 | OUTER SPROCKET | HDRSEPOWER (hp) 345.27 | * * * | FUEL CONSUMED (gal.) | * * * | רחס | SPEED (rpm) 14163.94 | VOLTAGE (volts) 21.25 |
| PARAMETERS | VEHICLE VEHICLE | SE DATA | CUMMULATIVE DISTANCE (ft) 28000 | MANCE DATA | | TORQUE HDR: (ft-1b) 3200.76 34 | REY DATA | FUEL CONSUMPTION (1b/hr) 397.18 | VE DATA | OR | HORSEPOWER (hp) 355.95 | FIELD POWER (Kw) 15.0 |
| | MAX. LAT ACCEL. (g's) | COURSE | TIME (sec) | PERFORMANCE | PROCKET | SPEED (rpm) 566.56 | / ENERGY | ENGINE SPEED (rpm) 3200.00 | C DRIVE | SPROCKET MOTOR | TORQUE HC (ft-1b) 131.99 | CURRENT (amps) 13579.82 |
| MISSION | MAX. VELOCITY (mph) 45.00 | MISSIM | GRADE RADIUS (%) (ft) 1.75 0 | VEHICLE F | INNER SPROCKET | HORSEPOWER (hp) 345.27 | ENGINE | SEGMENT ENERGY LOSS (btu) 3251.25 | ELECTRIC | INNER | SPEED T((rpm) (14163.94 | VOLTAGE CI (volts) (, 21.25 13 |
| * * * | SURFACE COMPACTED SOIL | * * * | DISTANCE GR (ft) (1000 1 | > ** ** | | LATERAL ACCELERATION (g's) O.000 | * * * * | CUMMULATIVE ENERGY USED (btu) 794986.30 | * * * | | GENERALUR POWER (Kw) S77.03 | BUSS CURRENT (amps) 27159.65 |
| | | | SEGMENT NO. (#) 28 | | | TRACTIVE EFFORT (K-1bs) 5.75 | | SEGMENT ENERGY (btu) 10646.64 | | - H | SPEED (rpm) 10400.00 | BUSS VOLTAGE (volts) 21.25 |
| | COURSE DATA INPUT BY USER | | LAP NO. S (#) | | | FORWARD VELDCITY (mph) 45.00 | B-194 | HORSEPOWER GENERATED (hp) 994.13 | | | 10 | |

APPENDIX C

CONFIGURATION III ANALYSIS

ENGINEERING SHEET

Project: ELECTRIC DRIVE

Page __ of 9

Title: CONFIGURATION II ANALYSIS

1. INTRODUCTION

FOR THE PURPOSE OF THIS ANALYSIS THE FINAL DRIVES ARE ASSUMED TO BE A CONVENTIONAL ARRANGEMENT OF SPUR REDUCTION GEARS COMBINED WITH A PLANETARY SECTION TO SUM THE PROPULSION AND STEER INPUTS.

THE APPROACH USED IS AS FOLLOWS :

- · BRIEF DISCUSSION OF CONFIGURATION III
- · GEAR AND POWER FLOW ANALYSIS
 - ASSUMPTIONS / BACKGROUND
 - ARRANGEMENT OF COMBINING PLANETARY
 - ARRANGEMENT #1

GEARING

POWER FLOW SCHEMATIC

- ARRANGEMENT # 2

GEARING

POWER FLOW SCHEMATIC

· RESULTS

| Signature K. HIRATA | Date of Signature Date of 2 JULY 84 | C-2 | es | Date of Signature | Date Understood |
|------------------------|-------------------------------------|-----|----|-------------------|-----------------|
| R. GRIFFITHS | | | | | |

| ENG | NE | ER | NG | SH | EEI |
|-----------|----|----|----|----|-----|
| Division: | | | | | |

| - | - | ٠. | |
|---|---|--------|--|

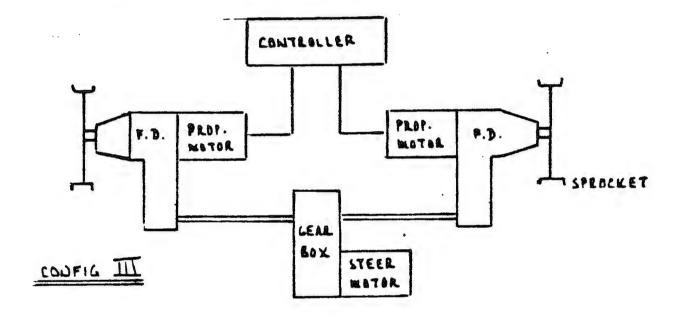
| Division: | |
|-------------|--|
| Project: | |
| Page 2 of 9 | |

2. DISCUSSION OF CONFIGURATION III

IN ORDER FOR CONFIGURATION II TO FUNCTION :

- a) BOTH PROPULSION MOTORS MUST OPERATE AT IDENTICAL SPEEDS AND THUS CONTROL THE AVERAGE VEHICLE SPEED.
- b) THE STEER MOTOR CONTROLS STEERING ONLY.
- C) THE FINAL DRIVES MUST HAVE SOME TYPE OF COMBINING PLANETARY.

A SKETCH OF THIS CONFIGURATION APPEARS BELOW:



| | | 0 0 | | Date of Signature | Date Understood |
|-------------------|-------------------|-----------------------------|---------------------------------|-----------------------------------|---------------------------------|
| Date of Signature | Date of C | 6-3 | | | |
| | | | | | |
| | Date of Signature | Date of Signature Date of C | Date of Signature Date of C C-3 | Date of Signature Date of C C – 3 | Date of Signature Date of C C-3 |

ENGINEERING SHEET

| Division: _ | | |
|-------------|---|---|
| Project: _ | | |
| Page 3 o | 9 | (|

Title:

3. GEAR AND POWER FLOW ANALYSIS

THE FOLLOWING ANALYSIS IS TYPICAL FOR A PLANETARY GEAR SET BASED ON MATHEMATICAL PROCEDURES AND PLANETARY GEAR SET OPERATION.

a) ASSUMPTIONS / BACKGROUND :

SYMBOLS USED

T = TORQUE

W = ANGULAR VELOCITY

N = NO, OF TEETH

SUBSCRIPTS

S = SUN GEAR

I = INTERNAL GEAR

C = CAGE

SIGN CONVENTION

INPUT HP = + , OUTPUT HP = -

SIGN AND OUTPUT SPEED AND TORQUE WILL

HAVE OPPOSITE SIGH . ZT = 0 . (PROOF @ P. C-10)

TORQUE RELATIONSHIP

$$T_{\underline{x}} = -\frac{M}{1+M} T_{\underline{c}}$$
 .: $T_{\underline{S}} + T_{\underline{r}} = -T_{\underline{c}}$

b) ARRANGEMENT OF COMBINING PLANETARY:

TWO ARRANGEMENTS WETE ANALYZED AS FOLLOWS

| | # 1 | ± 2 | | | |
|---------------|-------------|-------------|--|--|--|
| CAGE | OUTPUT | | | | |
| INTERNAL GEAR | PROP. MOTOR | STEER MOTOR | | | |
| SUN GEAR | STEER MOTOR | PROP. MOTOR | | | |

| Signature | Date of Signature | Date of Co | C-4 | 185 | Date of Signature | Date Understood |
|-----------|-------------------|------------|-----|-----|-------------------|-----------------|
| | | | | | | |

ENGINEERING SHEET

| Division: | |
|-------------|--|
| Project: | |
| Dags 4 of 9 | |

Title:

ANALYSIS OF THESE ARRANGEMENTS PROVIDE THE
BACKGROUND FROM WHICH CONFIGURATION III POWER
FLOW ANALYSIS CAN BE DERIVED. ARRANGEMENT \$1
IS ANALYZED FIRST FOR GEARING AND POWER FLOW;
THEN ARRANGEMENT #2.

d) ARRANGEMENT #1 (INTERNAL = PROP. MOTOR, SUN = STEER MOTOR, CAGE = OUTPUT)

GEARING

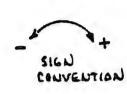
SIDE DRIVING TOUR TRACK

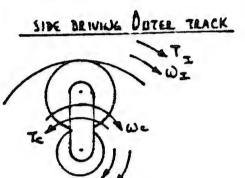
INT I

CACE C

SIEN S







- SINCE THE SUN GEARS ARE DRIVEN BY THE STEER MOTOR THEY MUST HAVE OPPOSING SPEEDS AS SHOWN ABOVE TO SLOW DOWN INNER TRACK AND SPEED UP OUTER TRACK.
- BY DEFINITION (PAGE 3) AT THE INNER TRACK SIDE, TO & WO ARE SAME SIGN (BECAUSE OF REGENERATIVE HP FLOWING INTO UNIT FROM TRACKS). AT OUTER TRACK SIDE, THE SIGNS OPPOSE BECAUSE HP IS FLOWING OUT OF UNIT.
- FROM TORQUE RELATIONSHIP (PAGE 3), BOTH SUN TORQUE, TO BE INTERNAL GEAR TORQUE, TI MUST BE OF OPPOSITE SIGN FROM CAGE TORQUE, TO, SHOWN ABOVE.
- . THE SIGNS OF SPEED, W; TORQUE, T & ; HP WILL THEN BE :

| | | INNER | 2 TRACK | | OUTER TRACK | | | |
|---|----|-------|---------|--------|-------------|-------|--------|--|
| | | - | - s | | I | S | د | |
| | | PROP | STEER | OUTPUT | PROP | STEER | PUTPUT | |
| Γ | w | + | _ | + | + | + | + | |
| + | T | _ | _ | + | + | + | - | |
| r | HP | _ | + | + | + | + | - | |

| | A | SEE SIG | N CONVE | MOULH | OUT , + = | · IN | | |
|-----------|----------|---------|-------------------|---------|-----------|------|-------------------|-----------------|
| Signature | | PREVIO | Date of Signature | Date of | 001 | 1 | Date of Signature | Date Understood |
| | | | , | 1 | C-5 | | T | |

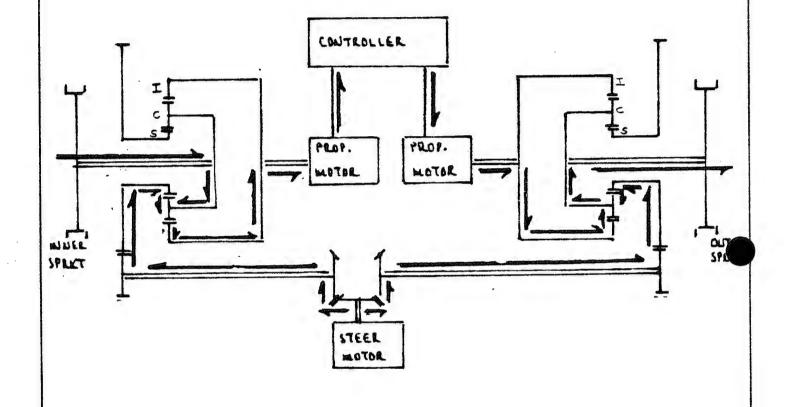
| _ | | - | | - | - | _ | | 011 | | _ |
|---|---|---|----|---|---|---|-----|-----|----|---|
| Ε | N | G | IN | E | E | R | ING | SH | EE | - |

| Division: | |
|-------------|--|
| Project: | |
| Page 5 of 9 | |

Title:

POWER FLOW SCHEMATIC

REGENERATIVE HP FLOWS INTO THE PROPULSION MOTOR AND NOT THROUGH THE STEER CONTROL SHAFT.



FORWARD

STEER
DIRECTION

C-6

Signature Date of C

| Date Understood |
|-----------------|
| |
| |

ENGINEERING SHEET

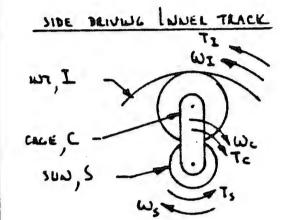
| Division: | |
|-------------|--|
| Project: | |
| Page 6 of 9 | |

Title:

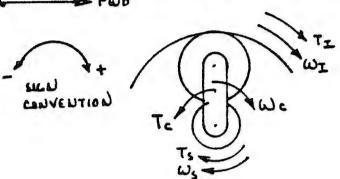
e) ARRANGEMENT #2 (INTERNAL = STEER MOTOR, SUIJ = PROP MOTOR,

CAGE = OUTPUT)

GEARING



SINE DRIVING OUTER TRACK



- . SINCE THE INTERNAL GEARS ARE DRIVEN BY THE STEER MOTOR, THEY MUST HAVE OPPOSING SPEEDS AS SHOWN ABOVE.
- . THE SIGNS OF THE TORQUE WILL BE THE SAME AS FOR ARRANGEMENT #1.
- . THE SIGNS OF W, T, HP WILL THEN BE :

| | | INNER | TRAC | K | OUTER TRACK | | |
|---|----|-------|------|--------|-------------|---------------|--------|
| | | 7 | S | c | I | S | _ |
| | | STEER | PROP | OUTPUT | STEER | PROP MOTOR | OUTPUT |
| | w | - | + | + | + | + | + |
| T | 丁 | - | - | + | + | + | - |
| | HP | + | - | + | + | + | - |

A SEE SIGN CONVENTION ON PAGE 3: - : OUT , += IN

| Signature | Date of Signature | Date of C | C-7 | ures | Date of Signature | Date Understood |
|-----------|-------------------|-----------|-----|------|-------------------|-----------------|
| | | 1 | | | | |

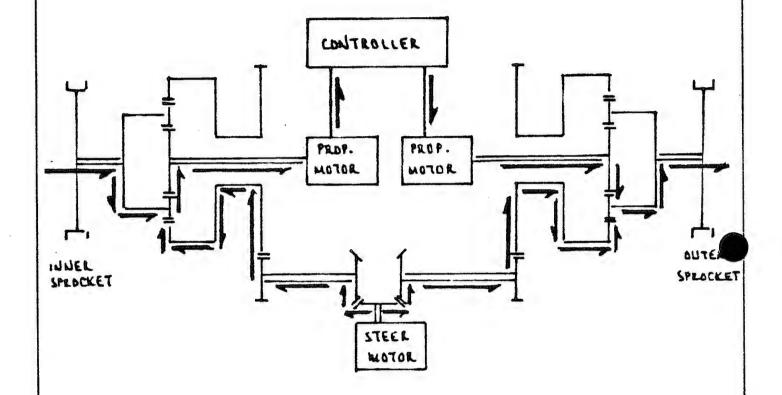
ENGINEERING SHEET

| Division: | |
|-------------|--|
| Project: | |
| Page 7 of 9 | |

Title:

POWER FLOW SCHEMATIC

REGENERATIVE HP FLOWS INTO THE PROPULSION MOTOR, AND NOT THROUGH THE STEER CONTROL SHAFT.



Signature Date of Signature Date of I

| • - | | |
|-----|-------------------|-----------------|
| | Date of Signature | Date Understood |

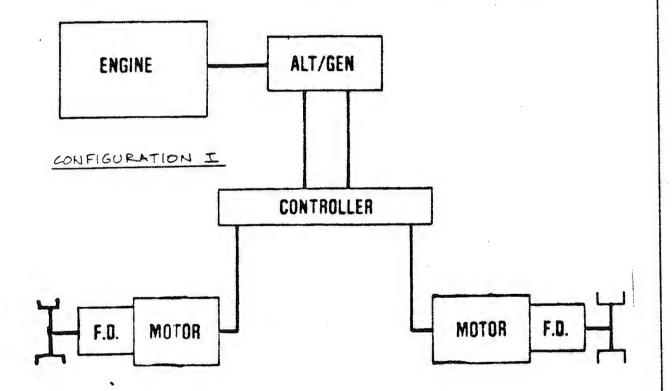
| ENGINEERING | SHEET |
|-------------|-------|
| Division: | |

| Division: | |
|-------------|--|
| Project: | |
| Pone 8 of 9 | |

Title:

4. RESULTS

- . IN BOTH ARRANGEMENTS, THE POWER FLOW
 IS INTO THE PROPULSION MOTOR (FROM STEERING
 REGENERATION)
- · BECAUSE REGENERATED POWER FLOW IS THRU INNER TRACK PROPULSION MOTOR, MOTOR TO CONTROLLER TO OUTER TRACK PROPULSION MOTOR, MOTORS AND CONTROLLER MUST BE SIZED TO TRANSFER REGENERATIVE LOADS. THIS IS THE SAME MANNER IN WHICH CONFIGURATION I OPERATES (SHOWN BELOW)



POWER EFFICIENTLY, BUT CONFIGURATION III HAS THE BURDEN OF CARRYING A STEER MOTOR AND SHAPTING TO ACCOMPLISH THE SAME TRANSFER THAT CONFIGURATION I CARRIES OUT. A SUMMARY OF THIS FACT IS ON THE NEXT PAGE.

| | | | | Date of Signature | Date Understood |
|-----------|-------------------|------------|-----|-----------------------|-----------------|
| Signature | Date of Signature | Date of Ci | | Date of Signature | } |
| | • | • | C-9 | | |
| | | | 0-5 | | |
| | | 1 | | • | |

ENGINEERING SHEET

| Division: | ~ |
|-------------|---|
| Project: | |
| Page 9 of 9 | |

Title: Detailed analysis shows regenerative HP flow is through F.0. : This arrangement has no advantage over MOTOM STEER CONTROLLER ALT/GEN the propulsion motors MOTOR Configuration ENGINE Configuration III F.D. C-10 Date of Co

ENGINEERING SHEET

Division: ______

Project: _____

TITLE: SICH OF INT ! SUN TORIC

Project: _____

DISCUSSION

IN A COMBINION PLANETARY, WHEN WE APPLY THE SIGN CONVENTION FOR IT? (IE + = INPUT , - = OUTPUT)
WE FIND THAT THE SUN ! INT TORK MUST HAVE THE SAME SENSE (IE POSITIVE OR NEGATIVE SIGN)

WE WILL PROVE THE ABOVE PT . IN THE FOLLOWING ANALYSIS

CONVENTION

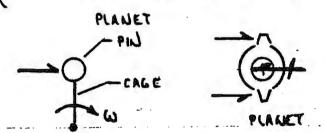
+ = 111 דעינה - = 111 דעינה

= APPLIED FORCE

- REACTION FORCE

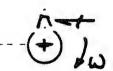
2 = + W

TA CACE = BUTPUT PLANET TORTH LOADS BOTH ARE APPLY)



| | INT | ากก |
|--------------|----------|----------|
| FORCES | REACTIVE | REACTIVE |
| BRIVE R DE N | BRIVER | beine R |
| IT SIGN | + | + |
| M 216N | 4 | + |
| TOLK SIGN | 4 | + |





A ROTATION IS OPPOSITE TO DIRECTION OF REACTIVE FORCE

| 29 Apr 85 | Di |
|-----------|-----------|
| | 29 Apr 85 |

| _ | 4 | 4 |
|----|---|-----|
| | | - 1 |
| U- | ı | _ |

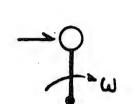
| Date of Signature | Date Underwood |
|-------------------|----------------|
| | |

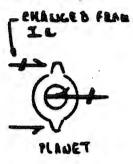
| Division: | |
|-----------|------|
| Project: | |

| Division | : | | |
|----------|---|------|--|
| Project: | | | |

TITLE SIEN OF INT & SUN TORIC

| IP - | PAGE - | דעי דעס | h | |
|--------|--------|---------|-------|--------------|
| PLANET | NF DOT | LOADS | PJ99A | : REACTIVE) |





| 41 | B |
|----|-----|
| | |
| ~ | |
| | Z W |

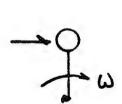
Page 2 of ___

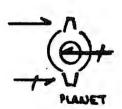
| | 741 | SUN | |
|-------------|---------|----------|--|
| FARCES | APPLY | BEACTIVE | |
| DRIVER BE N | BRIVE N | Seine R | |
| IN SIGN | | + | |
| W SIED | - | + | |
| TOLK (IGN) | + | + | |

ROTATION IS IN SAME DIRECTION AS APPLY FORCE

I'm CAGE = OUTPUT

(APPLY : REACTIVE FORCES)





| rui | E VIII W |
|-----|----------|
| | 7- |

| | רמו | 200 |
|--------------|----------|---------|
| FORCES | REACTIVE | APPLY |
| DRIVE R DE N | DRIVE R | DRIVE N |
| ITP SIGN | + | _ |
| W SIEN | + | Comp. |
| TOLK SIGN | + | + |

| ในม | (+) | ال |
|-----|----------|----|
| מטג | (| I |

| ignesure | M | 29 APL 85 |
|----------|---|-----------|
|----------|---|-----------|

| C- | 1 | 2 |
|----|---|---|
| O | т | 4 |

| Plants | Data of Signorure | Date Understand |
|--------|-------------------|-----------------|
| | | |

| SME | FMC | Corporation |
|-----|-----|-------------|
|-----|-----|-------------|

ENGINEERING SHEET

THE SIGN OF INT. SUN TORK

| Division: | |
|-----------|----|
| | |
| Page 3 | of |

I a PAGE & INPUT | BOTH PLANET LOADS ARE REACTIVE)

PLANET



| | 1+ |
|---|-----------------|
| - | (©) |
| | Vat |
| | PLANET |

| INT | - W |
|-----|-----|
| 4 | 7 |
| | -14 |

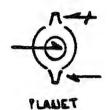
| -3/ | 7 |
|-----|----|
| (+) | 46 |
| SUN | |

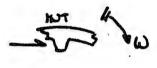
| TUI | 7117 |
|---------|---------------|
| APPLY | APPLY |
| BRIVE N | BANE N |
| - | |
| + | + |
| *CHINA | - China |
| | APPLY DRIVE N |

IL b CAGE - INPUT

(PLANET TOOTH LOADS ARE APPLY ! REACTIVE)







| | 741 | ในบร |
|--------------|---------|----------|
| FORCES | APPLY | REACTIVE |
| DRIVE R DR N | BRIVE N | DRIVE & |
| W 116N | - | + |
| W SIGN | + | - |
| TORK SIGN | - | - |

| Signature | 14 | 29 APE 85 |
|-----------|----|-----------|
|-----------|----|-----------|

| C-13 | | Day of Cincoln | Down I have record |
|------|--------------|-------------------|--------------------|
| | na Signatura | Date of Signature | Com Unestrated |
| | | | |
| | | | 1. |

ENGINEERING SHEET

| Division: | | |
|-----------|------|------|
| Project: | | |

TITLE: SIGN OF INT & SUN TORIC

Page 4 of 4

I C CAGE - INPUT

PLANET TOOTH LAADS IMAPLES HAVE IT &

PLANET PW

BALE





| | 1WT | SUN | | | |
|--------------|----------|----------|--|--|--|
| FORCES | REACTIVE | APPLY | | | |
| BRIVE R DE N | BRIVE R | BRIVE N | | | |
| UP SIGN | + | <u> </u> | | | |
| FT ZIEN | | + | | | |
| TORK SIGN | - | - | | | |

CONCLUSION

THERE ARE 6 POSSIBLE COMBINATIONS OF SUIN : INT TORK AS SHOWN IN THE PRECEDING AWALYSIS. IN ALL 6 CASES, THE SIGN OF THE TORK ARE THE SAME (IE BOTH POSITIVE OL BOTH WEGATIVE)

| Signature V | 29 APE 85 | | |
|-------------|-----------|--|--|
| | | | |

| C-14 | | | |
|------|----------|-------------------|----------------|
| | Probarts | Date of Signature | Date Understoo |

APPENDIX D

CONFIGURATION IV ANALYSIS

Appendix D Configuration IV Analysis

The information in this appendix supplements the discussion in Section 5.2.6 in the main body of the report.

CVX 650 FOWER

FLOW ANALYSIS .

ENGINEERING SHEET

| Division: | |
|-------------|--|
| Project: | |
| Page 1 of 3 | |

(Title: XHM 650 TOUT & MP

BISCUSSION

FROM ALLICON TABULATION OF SPAS - PARTIAL TABLILATION OF TABLES, TOUT : HP WILL BE CALCULATED

STOL

III TOUT NOT TABLELATED IN ALLISON DATA
HEURE BETERMINED BY

1 + REV : TOUT : TS2 (50 132)

 $2 : T_{K}(\frac{132}{30})$

- 12) CALCUS FOR 300 NOT PERFORMED SINCE THERE IS AN ERROR IN 340 RANCE SPEEDS. ? PRESUMABLY IN TORK ALSO
- 131 1087. LEAR EFF ASSUMED
- 14) MAX MOTOR OUTPUT TORK OF 2437 IS FOR 100%.

 PUMP MOTOR TORK EFFICIENCY

 IN FACT BOTH TORK ! VOLUMETRIC EFF ARE ASSUMED TO DE 100%.

 IN ALLISON TABLE SINCE MUMP HP = MOTOR HP

 PUMP / MOTOR CIR = 35

A ABS SPD (IS ACTUALLY NEG.)

ENGINEERING SHEET

| | , | | | | | |
|-------|----|------|------|------|-----|------|
| TI. (| 52 | (32) | INCE | TuaT | NoT | TAB. |

| • | TK | (| 132) |
|---|----|---|------|
| | | • | / |

Project: _____ Page 2 of ___

| Τ | דטם | TU9 | | INP | 7 | | - | PUM P " | | | • | MOTOR | | |
|----|------|--------|-----|-------|-------|-----|------|----------|---|----------|----------|-------|----------|------|
| 2 | EL. | LBFT | HP | RIM | 16 67 | HP | FINA | 16 67 | 1 | 16 | RPM | 1667 | | HP |
| 0 | | 10,982 | 0 | 26 00 | 0 | 0 | 1938 | 0 | P | ٥ | 0 | 2437 | M | 0 |
| 1 | 90 | 11,397 | 228 | " | 461 | 118 | 1774 | 619 | | 265 | 451 | 2437 | | 209 |
| 2 | | 13220 | | W | 1017 | 583 | 1610 | 1364 | | 418 | 901 | 2437 | | 418 |
| 3 | | 13 023 | | 11 | 1510 | 748 | 1446 | 2026 | | 558 | 1352 | 2168 | | 558 |
| 4 | | 9810 | | W | u | | 1282 | •• | | 495 | 1803 | 1442 | | 495 |
| 5 | | *าธระ | | u | u | | 1119 | | | 432 | 2253 | 180 6 | | 432 |
| 6 | | 6546 | 748 | u | u | • | 955 | • | | 368 | 2704 | 715 | | 368 |
| 7 | | *5606 | 747 | u | ** | • | 1027 | 1796 | M | 351 | 1506 | 737 | P | 352 |
| 8 | | 4205 | | u | " | • | 1173 | 1319 | | 295 | 2102 | W | | 225 |
| 5 | | 74360 | | W | 11 | - | 1320 | 947 | | 238 | 1699 | W | | 238 |
| 1- | 00 | ° 3523 | | " | u | • | 1467 | 650 | | 182 | 1296 | u | | 182 |
| li | | 73567 | 747 | * | " | | 1613 | 406 | | 125 | 892 | ų, | | 125 |
| 17 | | ₹3271 | 147 | •• | 4 | | 1760 | 204 | | 68.4 | 490 | " | | 62.8 |
| 13 | | 3018 | | " | - | • | 1907 | 32 | | 11.6 | 86 | 4 | | 12.1 |
| 14 | | ₹ 2803 | | 4 | " | • | 2053 | 115 | P | 45.0 | -317 | u | M | 44.5 |
| 15 | | 2617 | 147 | 4 | 31 | 46 | 2200 | 242 | | 101 | -721 | 4 | | 101 |
| 16 | | 2452 | 747 | W | | ** | 2347 | 354 | | 158 | -1124 | u | | ISB |
| 17 | | | | 4 | " | | | | M | | | | P | |
| 18 | | | | " | u | | | | | | | | _ | |
| 19 | | | | W | 11 | | | | | | | | _ | |
| 2 | 0 88 | | | M | u | | | | | | | | <u> </u> | |
| 2 | 1 | | | * | u | | | | | | | | 1_ | |
| 2 | ι | | | | " | | | | | | | | | |
| 2 | 3 | | | W | ** | | | | P | - | | | M | |
| 2 | 4 | | | u | " | | | | | | ļ | | | |
| 2 | 5 | | | " | " | | | | | | | | - | |
| 2 | 6 | | | M | " | | | | | - | | | _ | |
| 2 | 7 | | | u | 4 | | | | | | - | | 1 | |
| 2 | 8 | | | A | * | | | | L | <u> </u> | | | 1_ | - |
| 2 | 3 | | | W | " | | | | | | | | + | |
| 3 | 0 60 | | | W | | | | <u> </u> | 1 | | | - | 1 | ļ |
| 3 | 1 | | | 14 | J | | 1 | | | | 1 | 1 | | |

D-5

ENGINEERING SHEET

Division: _____

Project: _____ Page 3 of ____

Title: XHM 650 Tout! HP

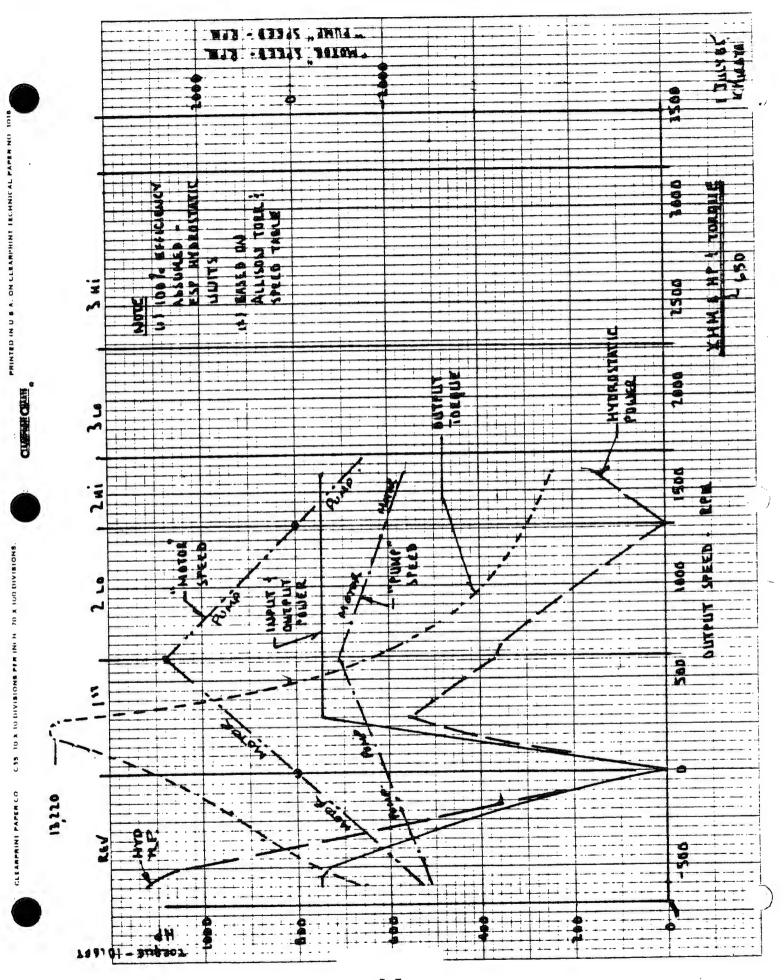
| | 0 | דטקדע | | 1 | דטיוט | | • | PUMP | ** | | | MOTOR | 4 | |
|-----|-------|--------|-----|------|-------|-----|-------|-------|----|------|--------|-------|---|------|
| | RPH | ra eta | HP | RPHL | 18 FT | HP | RPWL | 18 FT | | HP | Q. | LOFT | | HP |
| 1 | 0 | 10,982 | ٥ | 2600 | 0 | 0 | -1938 | ۵ | P | 0 | 0 | 1437 | M | 0 |
| | -100 | 10127 | 193 | - | 389 | 193 | -2102 | 523 | | 209 | -451 | 4 | | 209 |
| REV | - 200 | 2327 | 358 | 44 | 721 | 357 | 1266 | 968 | | 418 | - 201 | 4 | | 418 |
| 7 | -300 | 8762 | 500 | • | 1010 | 500 | -2430 | 1356 | | 627 | - 1352 | 44 | | 627 |
| | -408 | 8207 | 625 | • | 1263 | 625 | -2593 | 1694 | | 836 | -1803 | W | | 837 |
| | -500 | 7720 | 135 | • | 1484 | 735 | -2757 | 1991 | | 1045 | - 2253 | | | 1045 |
| | 1-600 | 6546 | 748 | · | 1510 | 748 | -2921 | 2024 | | 1127 | -1704 | 2185 | | 1127 |

D-6

Tsz (53 132)

September VV Dett of Signature | Aug 81

| TUNE | Date of Signature | Deta Understood | |
|------|-------------------|-----------------|--|
| | • | • | |



ENGINEERING SHEET

| Division: | |
|-----------|------|
| Project: | |

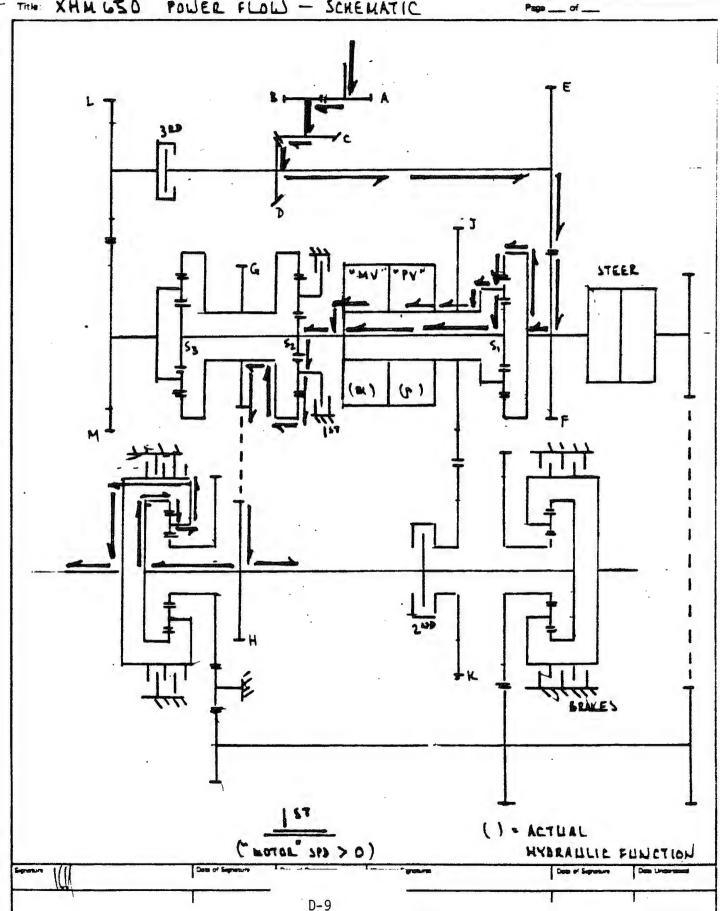
| THE XMM GED POWER FLOW - SCHEMATIC | Page of |
|---|---|
| B A A | STEER TO THE TO |
| | PRAYE? |
| T REN | |
| ("METOR" 598 < 0) Separation (() 30 J U (Y S S) 200 200 200 200 200 200 200 200 200 2 | HYDRAULIC FUNCTION |
| \ D-8 | |

ENGINEERING SHEET

Division: ___

Project:

- TITLE: XHM 650 POWER FLOW - SCHEMATIC

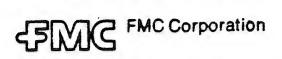


ENGINEERING SHEET

Project:

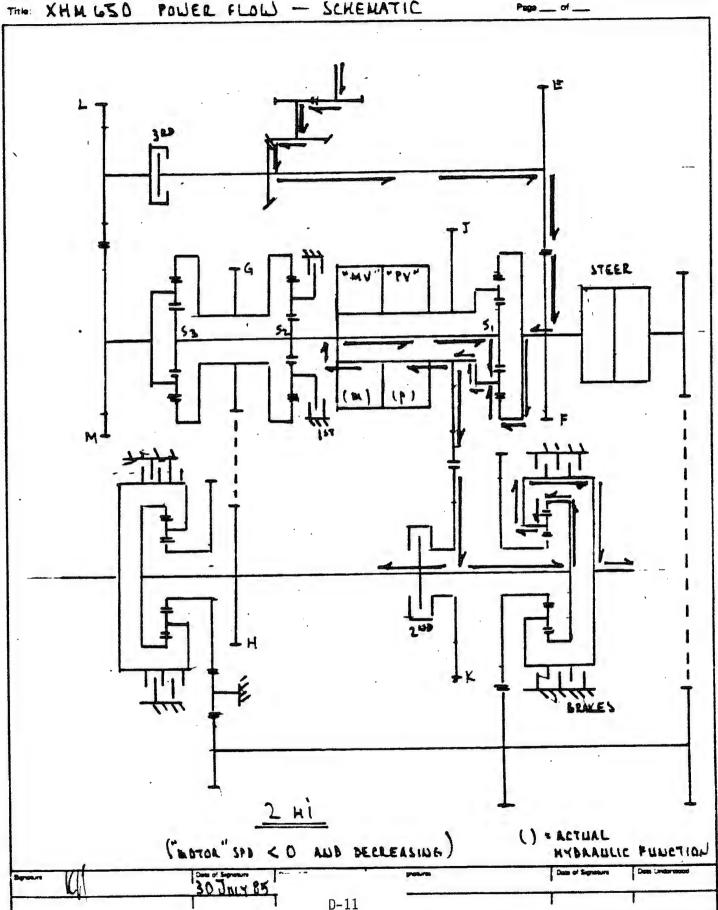
THE XHM 650 POWER FLOW - SCHEMATIC STEER () · ACTUAL ("MOTEL" SPD > 0 BUT BECREASING) HYBRAULL FUNCTION

D-10



ENGINEERING SHEET

THE XHM 650 POWER FLOW - SCHEMATIC



ENGINEERING SHEET

Page ___ of _

THE XHM 650 POWER FLOW - SCHEMATIC STEER 3 60 () = ACTHAL ("MOTOR" SPD < 0 BUT WEREASING) HYTRAULIC FUNCTION TULE OF

D-12

ENGINEERING SHEET

| Division: | |
|-----------|------|
| Project . | |

Project:

| Title: | XHM CZO LOMER LOM - STHEMYLL | |
|--------|------------------------------|--|
| Tries: | | FE STEER TO THE ST |
| | | FALE 3 |
| | | |
| | <u>3 HI</u> | () · ACTUAL |
| Span | ("morum 6PD > 0) | NYBRAULIC FUNCTION |
| | 30 July 85 D-13 | |

| | | N | G | IN | E | EF | IIN | IG | SI | 1E | E | 1 |
|--|--|---|---|----|---|----|-----|----|----|----|---|---|
|--|--|---|---|----|---|----|-----|----|----|----|---|---|

Division: _____

Project: _____ Page 2 of ___

2408.3

Title: XHM 650 POWER FLOW

| | 7 m; | (WE X. B. BEC | 1 DEC | 3 60 | 3 LU (WE < 0 ! INC | FINC | J SHI (| 341 (DE > 111) | 20 |
|------|----------------------------|----------------|-------------------|---------|---------------------|-------------------------|---------|-----------------|---------|
| | Şi | ı, | ر، | 5. | I. | در | 5. | I. | ů |
| 3 | 1 | ı | ŧ | 1 | 1 | 1 | + | 1 | 1 |
| - | 1 |) | + | + | + | 1 | 1 | 1 | + |
| 늪 | (+) | + | <u>-</u> | (-) | 1 | + 4 | (1) | (+) | - |
| | | | | | | | | | |
| | | | | 83 | E T | £) | 53 | IS | £ 03 |
| 3 | | | | 1 | 1 | 1 | + | 1 | 1 |
| ۲ | | | | + | + | ١ | + | + | , |
| H | | | · |] | 1 | (+) | + | ١ | (+) |
| ECK. | CHECK (FOR TEOU REM IN PUT | ווא ניי און | | | | | | | |
| | Lui e | 1600 Rem out | -Di | 360 | SLU & 2000 RIW BUT | Fue | Sui c | c 3260 arm out | T 667 |
| | 5. | 1, | ن | 15 | Ħ | 5 | \$ | ដ | ت |
| 3 | -1124.1 | - 3645.3 | - 3645.3 - 2346.7 | -711.4 | -3045.3 | 7 | 1511.6 | - 3045.3 | -1020.6 |
| ۲ | 9: | 25.1 | 21.1 | 9. | 1.15 | 2.75 | 1.0 | 1.75 | 2.75 |
| 100 | 1124.1 | 5329.3 | 5329.3 6453.3 | 4.111 | \$323.3 | L.1202 | 1511.6 | 5329.3 | 1806.T |
| 1 | | 21 | | 8.5 | I 3 | 3 | 5 | L | C3 |
| 3 | | | | - 712 4 | | -1040 < - 1119.4 7597 C | 7637 C | -4944 8 | -11794 |

| 6.1.1 | 200 |
|---------|-------|
| | A |
| | ACIA |
| | No. |
| | _ |
| | 40101 |
| | A |
| 2 8 9 9 | AC.2 |
| * | 4 3 |

Sepheture VIII Deta of Signature Deta Understood

Deta of Signature Deta Understood

Deta of Signature Deta Understood



Title: XHM 650 POWER FLOW

ENGINEERING SHEET

| Divisio |): | |
|---------|-----|---|
| Project | | _ |
| _ 1 | . 2 | |

| (+) + (+) + (Fer. 2600 RPW 1JPUT) | 1 | 111 | 111 (Wm 70 i | ()() | 7 -10 (| 2 LO (WW >0 !) | 739 |
|-----------------------------------|---------|-------|---------------|----------|---------|-----------------|---------|
| | ز | 1 5 | 1 | J | 2 - | H | |
| | 1 | + | 1 | ١ | + | 1 | |
| | + | 1 |) | + | 1 | 1 | |
| | 1 | 1 | + | (-) | Ī | + | J |
| - | | | | | | | |
| - | 100 | We 2 | 200 R. W or | The | 248 60 | e 1200 8 | arb our |
| 4 | C, | 3.5 | ŕ | Ü | \$ | ı,I | ני |
| -1740.2 -3045.3 -2 | -2934.4 | 901.4 | -3045.3 | - 1610.1 | 489.3 | -3045.3 | 7.0911- |
| 21.1 | 2.75 | 1.0 | 2. | 2.75 | 1.0 | 1.7 | 2.75 |
| | 9063.6 | 901.4 | \$329.3 | 4427.8 | 489.3 | 5319.3 | 4840.0 |
| | | | | 1 | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | - | | |
| | | | - | | | | |
| | - | | | | | | |
| | | | | | | | |
| ASSIME | | | | | | | |

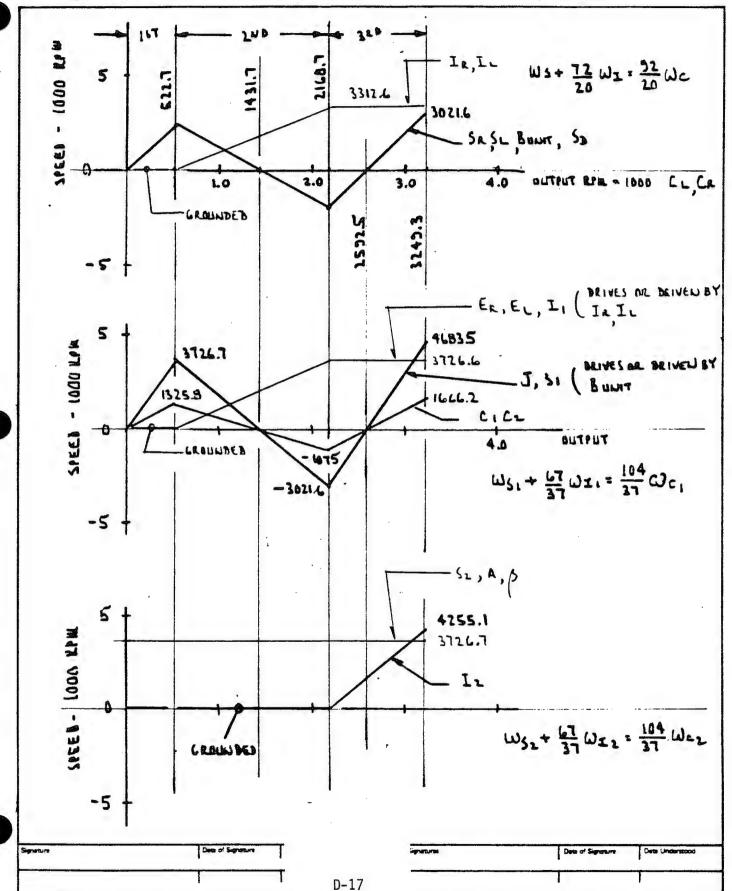
HMPT 500

SPEED ANALYSIS

e 2600 RPW ENGINE

ENGINEERING SHEET

LE HUPT SOU SPEED ANALYSIS



ENGINEERING SHEET

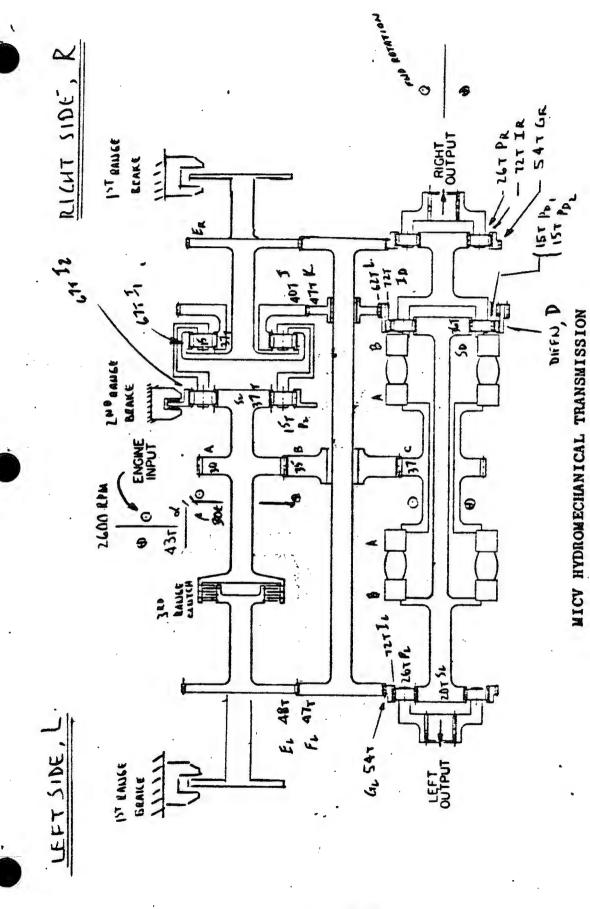
Division:
Project:
Page ___ of ___

TITLE GE HAPT 500 SPD ANALYSIS

| | | 7 | | h0 | 31 | — | |
|----------|--------|----------|-------------------|-------------------|----------|----------|---|
| ø. | 2688 | 12680 | 2680 | 2600 | 2600 | 2600 | Ì |
| BAA | 3726.7 | 3726.7 | 3726.7 -3154.3 | 3726.7 -3134.3 | 3726.7 | 3726.7 | |
| C (Auur) | 3821.6 | 3021.6 | 3021.6 | 3021.6 | 3021.6 | 3021.6 | |
| BL! BR | ٥ | 2404.3 | 0 | -1343.4 | ٥ | 3021.6 | |
| CL CR | U | 522.7 | 1431.7 | 2168.7 | 2592.5 | 3249.3 | |
| IL IA | ٥ | 0 | 1829.3 | 3312.6 | 3312.6 | 3312.6 | 7 |
| (b | ۵ | 24043 | 0 | -1949.4 | ٥ | 3021.6 | |
| Is, L | • | | ••• | •• | ٠,٠ | u | |
| 30,54 | * | • | • | • • | • | - | |
| L, Lo | • | • | * | •• | | | |
| K. | 0 | - 1581.5 | 0 | 1285.8 | 0 | - 1993.0 | |
| 3,51 | ٥ | 3726.7 | ۵ | - 3021.6 | ٥ | 4683.5 | 1 |
| I. | 0 | 0 | 2058.0 | 3726.6 | 37267 | 3726.7 | 7 |
| \$1,3 | 0 | 3726.7 . | ٥ | -3021.6 | ٥ | 4683.5 | |
| ro C₁ | 0 | 1325.8 | ٥ | - 1075.0 | ٥ | 1666.2 | |
| PC 2 | * | | | " | ,, | | |
| 12 | ٥ | D | • | ٥ | 1668.7 | 4255.1 | |
| 52,A.A | 3726.7 | 3726.7 | 3724.7 | 3726.7 | 3726.7 | 3726.7 | |
| ER EL | 0 | 0 | 2058.0 | 3724.6 | 3726.7 | 3726.7 | 1 |
| Fa FL | 0 | 0 | -2101.8 | - 3805.5 | - 3806.0 | - 3806.0 | |
| GR GL | O | 0 | 1829.3 | 3312.6 | 3312.6 | 3312.6 | |

Separature Desir of Separature

tures Deta of Signature Date Understood



21 CIR HYDRAULIC PUMP/MOTORS

GE HMPT 500 SPD ADALYSIS "L

D-19

TYPICAL SPLIT

POWER FLOW RANGE

SECTION ANALYSIS

IV

ENGINEERING SHEET

Division:
Project:
Page 1 of 9

THE 11 BUALYSIS - SPLIT POWER FLOW RANGE SECTION

MY 5200 1430 RPM # 30 RPS 230 LPM RIL 1 __ 1455 20 -1655 CALE (DUTPUT) SPB - 1000 RPM WITE: SEE NO I FOR LEWICIAL HI EON 4 FOR POWER TRAIN SCREMATIC 6 FOR POWER FLOW SCHEMATIC (WI " WEGATIVE) 1520.52 S FOR POWER PLOU WHENATIL) - WE : PALITIME FOR 500 LT ENCINE & 2400 194 1000 (\$200 LPM SUU) 500 LUDZ 244.06 118-0 244.87-ALT - MOTOR LOSS -285.13 CALE (PUTTUT) - 500 A ASSUMBLE 80% EFFICIENCY -1000 1375.46 D-21

Division: _____

TITHE MY ANALYSIS - SPLIT POWER PLOU RANGE SECTION Project:

SUMMER OF IN EARL

FOR EDLINE IN : 500

ALT - MOTHE EFF = 80%.

M = 1/2 - 2.636

CULE I WE DECATIVE

Ts = 500 (5252) (8 FT

#P1 = 300 (5252) W1 = 500 U1 - 8= W2+D1

MPI = = 500(5252) UI -500 = WI -6 = WI - 100 - 1

Me = Mar = 300 (5252) . WITEDE = 500 W+ WW1
- 34 WI+W1 5252 - 34 WI+W1

Misse. 21172 - 100 - 802

CASE IL WI & POSITIVE

71 = 500 (5252) LB FT

1135 = 500 (\$352) . WE = 500 NS

1171 - 500 (5752) - M WI - 500 MWI - 125 M WI + W >

WPC = 500 (5252) . W1+W11 = 500 W1+W02
1.25 = W1+W2
5252 | 1.25 = W1+W2

IP ALT TE ITE

117 con = . 2 88 ALT : . 25 119 I

| bysur | Data of Segrature | Done of Consession | ! Married Company | Date of Septement | Duty Undergood |
|-------|---------------------------------------|--------------------|-------------------|-------------------|----------------|
| | | T | 0 | | |
| | · · · · · · · · · · · · · · · · · · · | D-2 | 2 | | • |

ENGINEERING SHEET

Project:

THE IP ANALYSIS - SPLIT POWER FLOW RANGE SECTION

ENE I - COUT

FOR Ws 5200

CALCULATE IN e De 500 1000 : 430

| We | 540 | leou | 1430 | 130.3 |
|--------|-----------|----------|-------|----------|
| ωz. | - 1283.00 | - 593.32 | 0 | -1655 |
| IIPs . | 1042.33 | 658.43 | 500 | 1520.52 |
| 1792 | - 677.52 | -158.63 | 6 | -1275.66 |
| Me | - 364.42 | - 460.39 | - 500 | -244.87 |
| Men | - 135.58 | - 39.61 | -0 | -255.13 |

"217L

CUE II - COLT

TALCULATE MP & WE : 1500 2000 12500

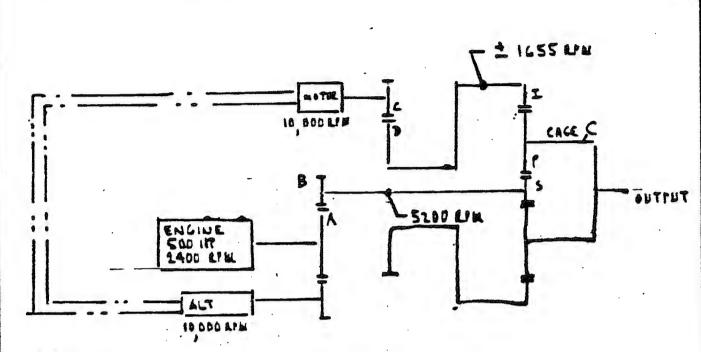
| Wc | 1500 ; | 2000 | 2500 | 2630 | |
|---------|----------|----------|----------|----------|-----|
| MI | 36.36 | 786.04 | 1475.72 | 1655 | |
| 1196 | 471.23 | 333.76 | 158.39 | 244.06 | |
| Mz | 23.02 | 132.55 | 193.29 | 204.75 | |
| 1Pc | - 434.25 | - 466.75 | - 451.68 | - 448.81 | |
| 17 1011 | - 5.75 | - 33.25 | - 48:32 | - 51.12 | . , |

.25 VP2

| Septement | Dett of Separation | | - | Date of September | Saw Understood |
|-----------|--|------|---|-------------------|----------------|
| | THE PERSON NAMED IN COLUMN TO PERSON NAMED I | D-23 | | | *. |

| Division: | | ٠. | |
|-------------|---|----|--|
| Project: | | | |
| Page 4 of _ | _ | | |

THE KY AUALYSIS - SPLIT POWER FULL ENCE SECTION



NA 2.1667

PEDPOSED SPB CHALLE SECTION

NI . 2.636 E M

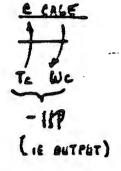
| ως: 3.636 ε ως: 5200 ως: 0 ως: 1430.1 ερμ ε ως: 5200 ως: 1655 | We = Ws+ | M W = Ws + 7.636 WI | |
|--|-------------|---|-------|
| e W: 5200 W2: 0 W: 1430.1 RPR (e W: 5200 W1: 1635 | e W1 = 5200 | . WI = - 1655 5200 + 2.636 (-1655), 230.3 PM | w c |
| 1 | | | (e to |
| W 5 | WE = | W1 : 1635 2630.0 21M | (W C |

THE 119 AUALYSIS - SPLIT POWER FLOW RANCE SECTION

| ومسمع | RULEJ | FORL | AUALYCIS | of | 119 | ; | ZORK |
|--------|-------|------|----------|----|-----|---|------|
| | 117 . | | | | | | • |
| กกระกา | 7 119 | 8 | SIGN | | | | |

SUD : INT TORK ARE SENSE

| INE I | Wz | 8 | _ |
|-------------|----------|---|---|
| <u>e 11</u> | <u>u</u> | | |
| + | + | | |
| 73 | Ws. | | |
| +1 | 19 | | |
| (ושפט | | | |



| CAS | e I | | Wz | 8 | 4 |
|-----|------|-----|----|---|---|
| | 2 | ยนผ |) | | |
| | - | + | | • | |
| | T | ພ | | | |
| | 4 | 119 | | | |
| | (11) | PUT |) | | |
| | | | | | |

| 4 | 1 |
|------|-------|
| 7 | T |
| To | we |
| - | M |
| (00 | TPUT) |

e CAGE

M ANALYSIS - PASE I (Wz - NEL)

SWEE WE IS OUTPUT IP, THE SO CALLED MOTOR BECOMES AN ALT AND RECIRCULATES IP BACIC INTO THE SUN.

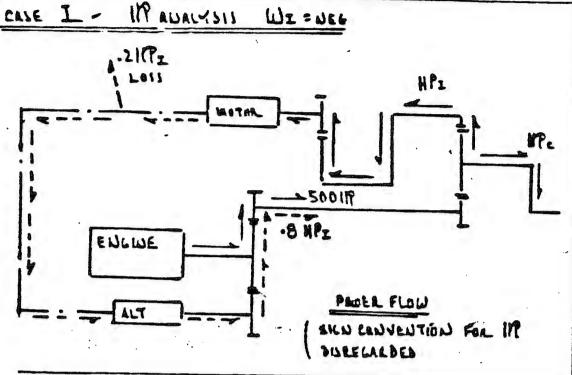
ASSUME BU & OVERALL EFF FOR THE ALT- MOTOR EFF

MOTOR Eth

| Senson | 16 (1484) | | Mer | Date of Suprement | Date Understand |
|--------|-----------|------|-----|-------------------|-----------------|
| - | 11395 | D-25 | | 1 | |

| Division: | |
|-----------|--|
| Project: | |

THE 11 AUALYSIS - SPLIT POWER FUND RANGE SECTION Prop Le of_



FAL THE OVERLE SYSTEM 500 + . 2 112 + 119 : 0

& MATE ME ! IN'S ALE NEL.

FOR W : RPM T : LOFT TE . MTS) IPE = MTSWY W2 : W:

$$\frac{T_{c} = (1+w)T_{s}}{U_{c} = \frac{T_{s}(U_{s}+MU_{z})}{1+w}} \qquad (e)$$

T CAGE TOLK IS SPROTITE TO SUD & JUT SUBSTITUTION IS THE LES WAY (B)

500 + - 2 MTS WI _ TS (WI + WUZ) - 0

| | Date of Segreture | | | | |
|---|-------------------|------|-----|-------------------|---------------|
| | in (s. Ad | D 26 | 700 | Dose of Supremure | Des Underwood |
| | 11 30 04 | D-26 | | | |
| • | 1 1 1 1 | | | | |

ENGINEERING SHEET

Division: _______Project: _______Page 7 of _____

THE IP AUALYSIS - SPLIT POWER FLOW RANGE SECTION

500 + T2 [.2 m Wz - W 2 - W 2] = 0

T3 = 500 (5252)

- 8 m W 2 + W 5

EQN

FOR W1= 5200 W2 = -455 : M= 2.636

Ts 1535.72 LB 49

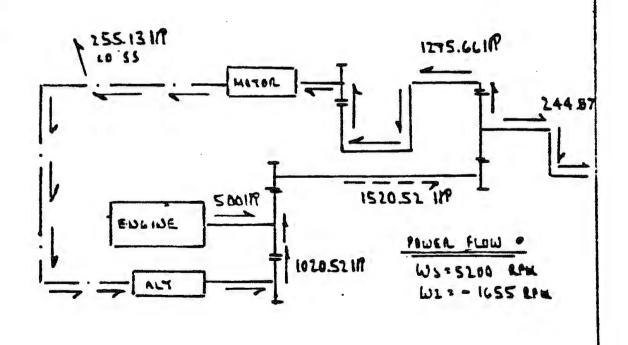
: KT6: 1520.52 -

11720 - 1275.66

. 2 172 s 1020.52

.2 112 1-255.13

IPc: -244.87 .



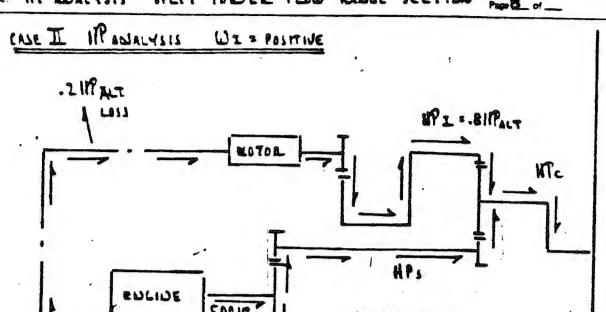
D-27

| ingrature 1/1 | Detr of September Dose |
|---------------|--------------------------|
| | 17 60 84 |
| | |

| : Signature | Date of Segreture | Date Undermood |
|---------------------------------------|-------------------|----------------|
| , , , , , , , , , , , , , , , , , , , | | |
| | | 3 |

| | _ | |
|-----------|---|---|
| | | |
| Division: | ` | |
| Project: | | - |

TITLE: IN WALYSIS - SPLIT POWER FLOW RANGE SECTION POPER OF



HPALT

(a) OTUL (a) ! (d) DAITUTIFIOUR

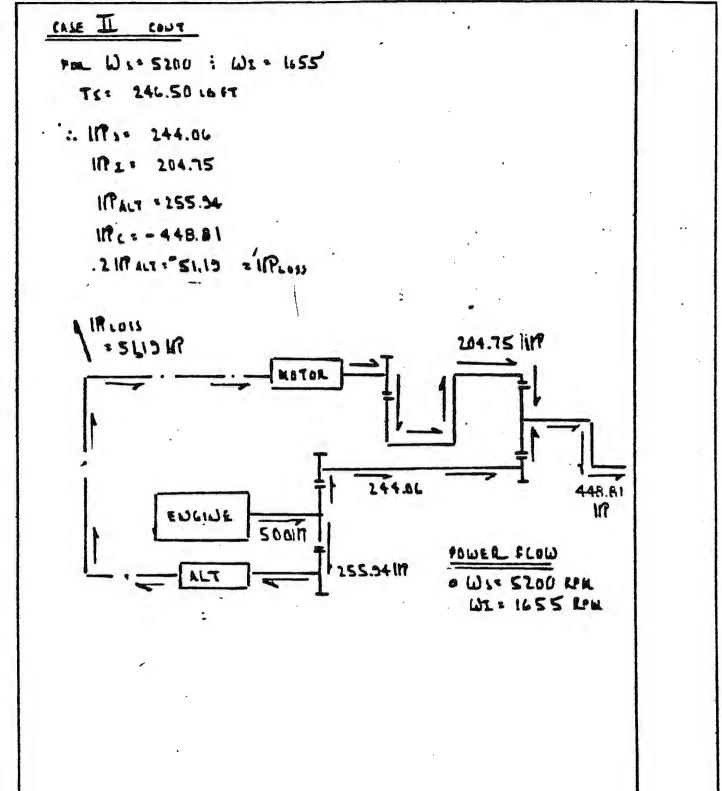
Ts equ

| Separation | 17 SEP 84 0m | | |
|------------|--------------|--|--|
| | | | |

ENGINEERING SHEET

| Division: | | _ |
|-----------|--|---|
| Project: | | _ |

THE HP ANALYSIS - SPLIT POWER FLOW RANGE SECTION POPE OF 7 of 7



D-29

This Page Intentionally Left Blank

APPENDIX E

ELECTRIC VEHICLE PERFORMANCE SIMULATION

E.1 Major Program Capabilities

Electrically driven, tracked vehicle-performance is simulated by this software package. Parameters which may be investigated include detailed electrical system performance, vehicle track dynamics, system losses and efficiency, incremental and average gross vehicle dynamics, and fuel economy. There are four subprograms which have been created to specifically consider each of these areas in detail. A brief description of each is given below.

E.1.1 Constituent Subprograms

o Electric Drive Performance - Steady-state vehicle powertrain analysis with detailed emphasis on electric power drive parameters. Electric motor voltages, currents, generated power and alternator/generator output are calculated, along with energy usage, heat rejection, and fuel use impact.

o Vehicle Acceleration Performance - Analysis of dynamic vehicle performance which realistically simulates the gross vehicle mission over the terrain conditions. Acceleration, deceleration, braking, and constant velocity conditions are considered.

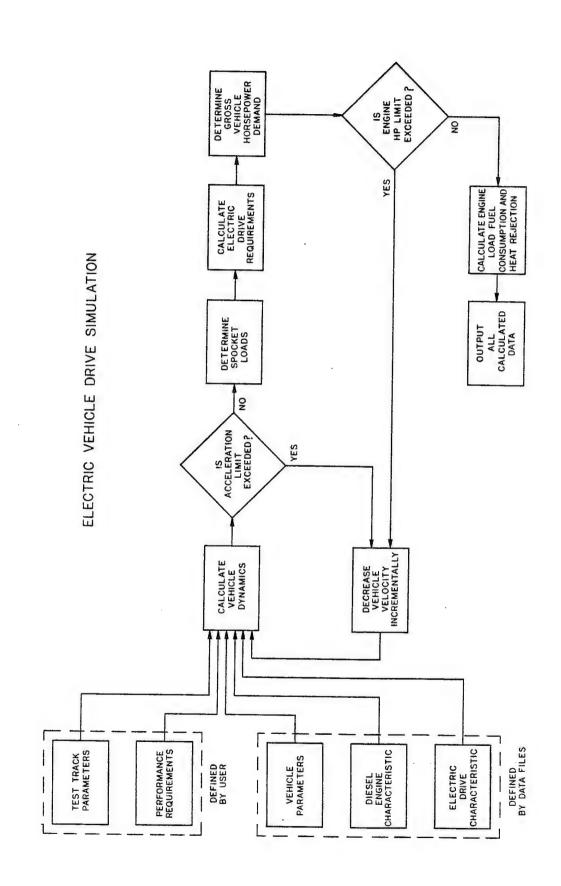
o Acceleration Dynamics Routine - Detailed analysis of full power acceleration during turning and nonturning maneuvers on user defined grades and surfaces. Incremental dynamic parameters are generated and tabulated.

o Reduction Dynamics Routine - Detailed analysis of speed/torque loading of all vehicle power train reduction elements. Final sprocket drives and prime mover interface reductions are included in the analysis.

Of four subprograms provided, the first two are perhaps the most useful for the consideration of the vehicle electric drive and the impact that it has on the overall vehicle mission. The latter two routines are best utilized for detailed investigation of those processes which help to make up the overall mission, but are not the parameters of major interest from a mission viewpoint. For this reason all further discussion will focus on the performance subprograms.

E.1.2 Ferformance Model Description

Each of the performance subprograms outlined above rely on an iterative energy balance technique to yield each steady-state operating point of the vehicle. The basic algorithm for this strategy is shown in Figure E.1.2-1. Test track parameters and



performance requirements are defined and input by the user, along with vehicle, engine, and electric drive data which are resident within the program's data files. The vehicle dynamics are then calculated utilizing a Merritt's track model which considers dynamics based on empirical data. centrifugal acceleration calculation is then performed to determine acceleration limit is exceeded. such a es personnel restrictions or vehicle track slip (surface coefficient or If exceeded, the vehicle velocity is reduced and the process iterates until the acceleration falls within the selected The sprocket loads which have been calculated are used to determine what the electrical requirements are for each of the sprocket motors. This data is reflected back through the electrical system, ultimately to the prime mover, where the gross vehicle horsepower demand is calculated. At this point the energy balance is tested. If the fixed maximum output power of the prime mover is adequate for the present demand, the resultant system heat rejection and fuel consumption are calculated. the system demands exceed the capabilities of the engine, the vehicle load is reduced by lowering the velocity until an energy balance is achieved. When this has been accomplished, either the calculated data is output to the user, as in the Electric Drive Ferformance subprogram, or it is further utilized in an acceleration or deceleration routine as in the Vehicle Acceleration Performance subprogram.

E.2 Program Options Available

The following six basic categories represent the various options which are available to the user from the program data files. Certain of the parameters must be defined by the user, such as the performance limitations which are addressed below.

E.2.1 Test Courses

There are four resident test courses provided within the software package. Each is broken down into segments of defined length, grade, and turn radius.

o MERADCOM Test Course - This course consists of a well defined track which is located in the Aberdeen Proving Ground, Maryland. Sixteen segments make up the track, which has a total circumference of 2.5 miles.

o Speed on Slope - A track consisting of thirteen segments of arbitrary length (1000 ft) was fabricated to aid in the derivation of the contractually required speed on slope curve. Grades from +60 percent to -60 percent are provided with intermediate grade points selected every 5 percent.

o Tractive Effort vs. Speed - This test track is set up with grade values which yield a relatively uniform distribution of tractive effort values (TE) when plotted against speed.

o Churchville Test Course - This test course is the most rigorous and complex provided in the software package. Highly detailed topographical maps of the Churchville area (part of Aberdeen Proving Grounds) were used extensively in the definition of this track, which is comprised of 88 segments. Steep grades, sharp curves, and short segments serve to make this a very demanding and useful evaluator of vehicle performance. The course, which is 3.33 miles in length, is shown in topographic form in figure E.2.1-1, and in elevation in Figure E.2.1-2.

F.2.2 Course Surface

To provide greater flexibility in the number of options available to the user, the surface coefficient of friction (\mathcal{H}) is selected apart from the physical dimensions of each course. Those available are given below:

- o Concrete/Asphalt, 4 = 0.80 (MERADCOM)
- o Compacted Soil, A = 0.70 (Churchville)
- o Loose Sand, A = 0.55
- o Rocky Terrain, $\mu = 0.45$
- o User Defined

E.2.2 Vehicle/Engine

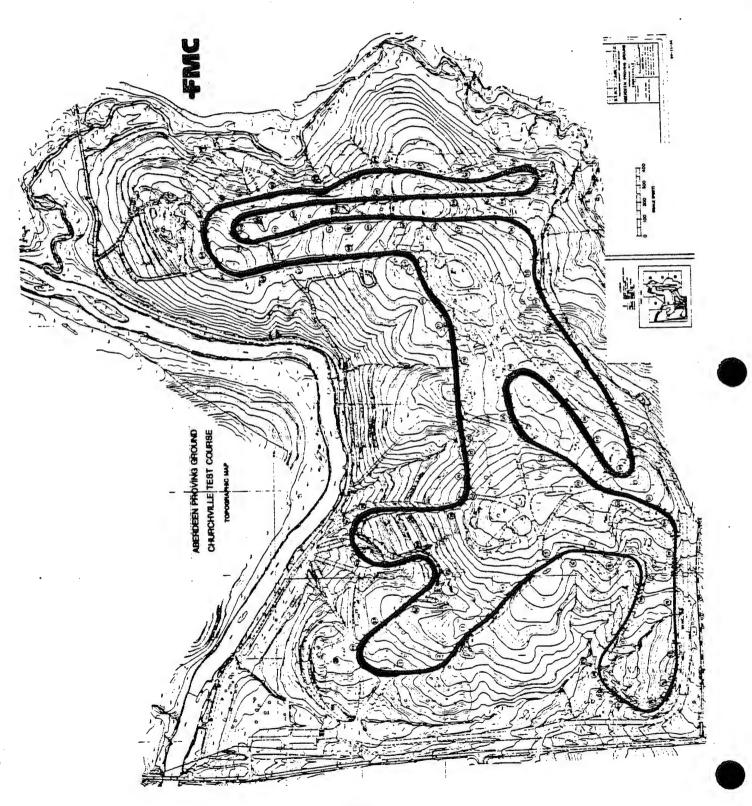
Both the 19.5 and 40.0 ton TACOM specified tracked vehicles are resident within the software package, as well as the specified engines (Cummins VTA-903 for the 19.5 ton, and the AD-1000 for the 40.0 ton). The option is also given to the user to define the parameters of their own tracked vehicle.

E.2.4 Engine Scheduling

Both constant and variable diesel engine scheduling is available to the user to aid the determination of which is more fuel efficient. Each technique utilizes fuel consumption curves for the VTA-903, and the AD-1000. With constant scheduling, fuel consumption is based on a relationship which is only dependent on demanded HP, whereas with variable scheduling, the demanded HP defines the engine speed which then yields the appropriate fuel consumption.

E.2.5 Electric Drive Type

The are eight electric drive types which are resident within the software package. The entire electric propulsion system is



10000 3000 6900 83 | 84 65 13000 2500 9500 1 18 | 08 | 44 | 45 8 ELEVATION VIEW 73 | 74 | 75 | 76 | 77 | 78 0000 8500 1 8 8000 000 1000 SEGMENT 20 | 21 | 22 SECLECINI 68 300 (T334) ELEVATION

U TEL

ABERDEEN PROVING GROUNDS CHURCHVILLE TEST COURSE

17500 17600

COUNTER-CLOCKWISE TRAVERSAL

15000

defined for each.

- o Homopolar, Generator Driven (parallel/series systems)
- o Homopolar, Alternator Driven (parallel/series systems)
- o Brushless DC, Alternator Driven (low speed-high torque/high speed-low torque)
- o High Frequency Induction, Alternator Driven
- o Commutated DC, Alternator Driven

E.2.6 Performance Limitation

Several inputs not available for the internal data files are required of the user. These include:

- o Maximum (final) Forward Velocity
- o Maximum Forward Acceleration
- o Maximum Deceleration
- o Maximum Lateral Acceleration

E.3 Vehicle Mission Simulation and Analysis

E.3.1 Electric Drive Performance

The emphasis of this subprogram is the steady state analysis of electrically driven vehicles on a segment by segment basis as the It is best suited for vehicle maneuvers over a given course. analysis of steady state electric drive mission performance, particularly if the course of the mission is relatively uniform, and the segments of each course segment are lengthy in comparison to the time it takes the vehicle to traverse them. sprocket data (see Figure E.4-2) for each track is available to as well as the equivalent sprocket motor dynamics. the user, and system electrical data is also generated, including voltages, currents, and power, including the net power which must be supplied (or absorbed) to both sprocket motors from the bus. These parameters aid in the evaluation of the system operation turns and regenerative conditions, and allow magnitudes and directions of system energy flow to be easily monitored. Net drive efficiency along with generated and lost are also provided to determine if overall system performance is within acceptable limits. These energies are reflected in terms of required prime mover power and the resultant fuel consumption. For further mission analysis, fuel economy is calculated, and a range estimate based on a specified vehicle fuel tank volume is made.

E.3.2 Vehicle Acceleration Performance

For any vehicle mission, this subprogram provides the user with the most realistic assessment of vehicle performance over All vehicle transitory states conditions. acceleration, deceleration, braking) between constant velocity conditions are considered in order to yield smooth vehicle motion The subprogram is specified for overall throughout the course. analysis rather than an electric drive component mission This is evident in the printed output page evaluation. Figure E.4-3) which provides detailed acceleration/deceleration information, but no internal electric drive data. The complete electric drive models are utilized for this analysis but transitory nature of the vehicle drive during the test periods makes it difficult to extract any meaningful output of the electrical parameters.

As with the Electric Drive Performance subprogram, power supplied by the prime mover is determined along with the system energy which is generated and lost. Fuel consumption data is presented as well as the full fuel tank range estimate. Cumulative mission information is available for each segment of the course, and can provide a useful means of evaluating incremental mission performance.

E.4 Program Outputs

Examples of the information which each of the subprograms outputs to the user are given in Figures E.4-2 to E.4-5. Figure E.4-1 is the main program header sheet that is included with each run to specify which subprogram is in use and which echoes all the data that has been input by the user.

SIMULATION MISSION ショコローロ ELECTRIC

DIVISION FMC / NUMTHERN DRINANCE MINNEAFULIS, MINNESOIA

REVISION DATE: 12/10/84 RUN DATE: 5/21/85

ELECTRICALLY DRIVCH, TRACE ED VEHICLE FERFORMANCE IS SIMULATED BY THIS FROGRAM. DETAILED ASPECTS OF VEHICLE FERFORMANCE BE INVESTIGATED USING THE FOUR RESIDENT SUB-FROGRAMS LISTED BELOW. THE SUB-FROGRAM IN USE IS IDENTIFIED WITH AN ASTERISK. CAZ

| 1 | |
|-------------|---|
| FERFORMANCE | |
| DRIVE | 1 |
| ELECTRIC | |
| * 1. | |

STEADY STATE VEHICLE FERFORMANCE ANALYSIS WITH DETAILED EMPHASIS ON ELECTRIC POWER DRIVE PARAMETERS. ENERGY USAGE, HEAT REJECTION, AND FUEL IMPACT ARE ALSO CALCULATED.

2.) VEHICLE ACCELERATION FERFORMANCE

DYNAMIC VEHICLE FERFORMANCE ANALYSIS WHICH REALISTICALLY SIMULATES GROSS VEHICLE MISSION OVER ALL TERRAIN CONDITIONS. ACCELERATION, DECELERATION, BRAFING AND CONSTANT VELOCITY CONDITIONS ARE CONSIDERED.

ACCELERATION DYNAMICS ROUTINE

t

REDUCTION DYNAMICS ROLITINE

4.

INCREMENTAL DYNAMIC DETAILED ANALYSIS OF FULL POWER VEHICLE ACCELERATION DURING TURNING AND NON-TURNING MANEUVERS ON USER SELECTED GRADES AND SURFACES. INCREMENTAL PARAMETERS ARE GENERATED AND TABULATED.

DETATLED ANALYSIS OF SPEED/TORDUE LOADING OF ALL VEHICLE FOWER TRAIN REDUCTION ELEMENTS. FINAL SPROCKET DRIVES AND DIESEL ENGINE INTERFACE ARE INCLUDED IN ANALYSIS.

DATE VEHICLE COURSE DATA

DIATO HNU DNU

MAX. POWER, hp= ENGINE: VIA-903

GROSS VEHICLE WEIGHT, tons* 19.5

sd.

FRONTAL AREA,

COEFFICIENT OF DRAG* 1 TREAD WIDTH, in. = 92.5

COEFFICIENT OF FRICTION# .7

SURFACE: COMPACTED SOIL COURSE: CHURCHVILLE

FERFORMANCE

LIMITS

90 ္ပ

PEAK MOTOR EFF. , Xm ALTERNATOR EFF. , %=

TYPE: HOFO! P-A

DATA

ELECTRIC DRIVE DAT

RECTIFIER EFF, %= 99.5 ALTERNATOR F.F., %= 90 2100 SFEED FOR MIN, FUEL, rpm= MAX. SPEED, rpm= 2960

COOLING LOSSES, % Ghp=

INLET/EXHAUST LOSSES, % Ghp= 1.5 AUXILIARY FOWER, hp=

MOTOR KM, V/Krpm-Am .005

MAXINUM VELOCITY, mph= 45

NUMBER OF SPROCKET TEETH= 11 ROLLING RESISTANCE, 16. per

TRACH FITCH, in. # 6.03 TRACE LENGTH, in. = 150

5

MAX, COURSE VELOCITY, mph=

MAN. LAT. ACCEL., 9'SF

SCHEDULING: VARIABLE

FUEL CAFACITY, gal. = 175

ton= 100

| | 1 | 1 |
|--|-----------|---|
| | | |
| | DOLL ST | |
| | DIGHTH IN | |
| | *** | |

| | ELECTRIC DRIVE TYFE | HoFol F-A | | RANGE ESTIMATE (miles) 130.85 | | | NET DRIVE EFFICIENCY (%) 67.70 | | FUEL ECONOMY (mpg) | | | # C | OWER 5 |
|------------|---------------------------|----------------|---------|--|---------------------------------------|---|---|----------|--|----------|--|---|---------------------------------------|
| | ENGINE SCHEDUL ING | VARIABLE | | AVG. FORWARD VELOCITY (mph) 18.51 | | | TOROUE (+t-1b) 7389,36 | | FUEL REMAINING (gal.) 174.94 | | OUTER SPROCKET MOTOR | HURSEFOWER | FIELD FOWER (E.M.) |
| | A COS | | | | * * * | OCKET | SPEED (rpm) 313.21 | | L MED •) 62 | | ER SPROCI | 10RQUE (ft-1b) 457.07 | CURKENT (amps) |
| * * * * | ENGINE | VTA-903 | * * * | CUMMULATIVE TIME (GEC) 8.99 | j | OUTER SPROCKET | HDRSEFOWER (hp) 440,67 | * * * | FUEL CONSUMED (qa).) O.062 | * * * | TUO | SPEED (rpm) 5220.23 | VOLTAGE (volts) |
| FARAMETERS | VEHICLE | 19.5 TON | SE DATA | CUMMULATIVE DISTANCE (ft) 244 | MANCE DATA | | TORQUE HORS (#t-1b) (-1978.51 44 | REY DATA | FUEL CONSUMPTION (16/hr) 194.97 | IVE DATA | OR | HORSEFOWER (hp) -100.79 | FIELD FOWER (EW) 17.0 |
| | MAX. LAT. ACCEL. | 0.0 | COURSE | TIME (\$EC) B.99 | PERFORMANCE | PROCKET | 4 | / ENERGY | ENGINE SPEED (rpm) 2587.32 | DI | INNER SFROCKET MOTOR | TOKQUE HO (+t-1b) -115,15 | CURKENT F (#mps) |
| MISSION | MAX. VELOCITY (mab) | 45.00 | MISSION | GRADE RADIUS (2) (41) 10.7 100 | HICLE | INNER SPROCKET | HORSEPOWER (hp) -103.91 | ENGINE | SEGMENT ENCRGY LOSS (btu) 1021.48 | ELECTRIC | INNER | SPEED TO (rpm) (4597.35 | VOLTAGE C: (volts) (c) 7.33 -93 |
| * * * * | SURFACE | COMPACTED SOIL | * * * * | DISTANCE GR(++++++++++++++++++++++++++++++++++++ | ! ! ! * * * * * * * * * * * * * * * * | S G G G G G G G G G G G G G G G G G G G | ACCELERATION (9's) | * * * * | CUMMULATIVE ENERGY USED (btu) | * * * * | TOTO COLUMNIA TO C | HETENNATION FOWER (RVA) 300.83 | FUSS CURRENT (amps) 45550.83 |
| | | | | SEGMENT NO. (#) | | TEACTIVE | EFFORT (k-1bs) 6.15 | | SEGMENT ENERGY (blu) | | OCH CHARLE | SPEED (rpm) | FUSS VOLTAGE (volts) 7,33 |
| | COURSE | CHURCHVILLE | | LAP NO. S (#) | | FORMSED | VELCCITY (mph) 18.50 | | HORSEPOWER GENERATED (hp) 497,46 | | 2 | ť = | |

| | ELECTRIC DRIVE TYPE | HoFol P-6 | | AVG, MISSION VELOCITY (mph) | | *** | 11ME · (\$ec.) | | FUEL ECONOMY (mpg) 0.98 | ************************************** | ELECTRIC DAIVE TYPE HOPOI F-G | | AVG. MISSION VELOCITY (mph) 31.78 | | * * * | TIME (\$ec) | | FUEL ECONOMY (mp4) |
|------------|------------------------|-----------------------|---------|--|-------------|-------------------|--|--------|--|---|------------------------------------|--------|--|-------------|-------------------|--|---------|---|
| | ENGINE SCHEDULING | CONSTANT | | | | DECELERATION * | DISTANCE (ft) 0.00 | | FUEL REMAINING (gal) 174.89 | ******* | ENGINE SCHEDUL ING | | | | DECELERATION * | DISTANCE (ft) 6.00 | | FUEL REMAINING (QA) |
| * * | ENGINE | VTA-903 | | F AVG, SEGMENT VELOCITY (mph) 23.64 | * * * | *** DEC | AVERAGE DECELERATION (g's) | | SEGMENT FUEL CONSUMED (gal) | * | ENGINE S | | E AVG. SEGMENT VELOCITY (mph) 38.39 | * | *** DECE | AVERAGE DECELERATION (g's) 0.00 | | SEGMENT FUEL CONSUMED (9al) |
| ¥ | r. VEHICLE | 19.5 TON | * * * * | CUMMULATIVE TIME (sec) | DATA ** | | 11ME (sec) 16.80 | * * * | FUEL MPTION /hr) 7.46 | *************************************** | VEHICLE | * * * | CUMMULATIVE TIME (Sec) 37.76 | *** | | TIME (Sec.) 20.80 | * | AVG, FUEL SEC CONSUMPTION C (16/hr) |
| FARAMETERS | MAX. LAT. | 00.0 | DATA | DISTANCE (ft) | | AT10N *** | DISTANCE (4t) 580,72 | * | | FARAMETERS | MAX. LAT. ACCEL. (g's) 0.50 | DATA | CUMMULATIVE DISTANCE (ft) 1760.00 | | *** NOI 1 | DISTANCE (ft) 1171.32 | * * * * | |
| | MAX. DECEL. | 0.20 | COURSE | C 11ME (Sec.) | PERFORMANCE | ACCELERATION | 9E 97 10N | Y DATA | RANGE ESTIMATE (miles) | HUL 7 | MAX. DECEL. (g's) | COURSE | CI TIME I (sec) 20.83 | PERFORMANCE | ACCELERATION | | / DATA | RANGE ESTIMATE (m) les) |
| MISSIM | MAX, FWD. ACCEL. | 0.50 | * | RADIUS T (+t) (- | | * * * | AVERAGE ACCLLERATION (0'E) 0.09 | ENERGY | CUMMULATIVE ENERGY USED (btu) 5717.46 | NO I SS I M | MAX, FWD. ACCEL. (g's) | * | KADIUS TI (ft) (e | | * * | AVERAGE ACCELERATION (g's) 0.02 | ENERGY | CUMMULATIVE ENERGY USED (btu) |
| *** | MAX. VELOCITY | | * * | GRADE (2) -0.10 | VEHICLE | | 11ME (\$60) 0.13 | * * * | BRAKING ENERGY (btu) | * * | MAX. VELOCITY (mph) 45.00 | * * * | GRADE (%) -0.30 | VEHICLE | | 11ME (\$8C) 0,03 | * * * | BFALING ENERGY (btu) 0.00 |
| т | SURFACE | CONCRETE/ASPHALT | | DISTANCE (4+) | * * * | -0CITY *** | DISTANCE (ft) 6.28 | | ENERGY REGENERATED (btu) 0.00 | *********** | SURFACE CONCKETE/ASFHALT | | DISTANCE (4t) | * * * * | OCITY *** | DISTANCE (+t.) 1.68 | | ENERGY REGENERATED (btu) 0.00 |
| | SUS | | | SEGMENT NO. (#) | | CONSTANT VELOCITY | FORWARD VELUCITY (mph) 33.08 | | ENERGY E LOSSES REG (btu) (| · · · · · · · · · · · · · · · · · · · | | | SEGMENT NO. (#) 2 | | CONSTANT VELOCITY | FORWARD VELOCITY (mph) 42.03 | | ENEKGY E LOSSES REG (btu) (0 |
| | COURSE | NI'FADCOM TEST COURSE | | LAP NO. | | * * * | LATERAL ACCELEKATION (g's) 0.00 | | ENERGY GENERATED ((btu) 5717.46 21 | · · · · · · · · · · · · · · · · · · · | COURSE | | LAF NO. 5 | | * * | LATERAL ACCELEMATION (g's) 0,00 | | ENERGY E GENERATED L (btu) (|

VEHICLE ACCELERATION DYNAMICS

| | ELECTRIC INE DRIVE TYPE | -903 HaFol B-A | | OUTER SPROCKET | SPEED TOROUE | | | 16.09 11908 | | | | | 83.20 9147 | | | | 139.50 5935 | | | | 200.12 4814 | | | | | | | 0012 47 4800 | | | | 219.02 | |
|---------------|--------------------------------|----------------|-----------|----------------|--------------|---------|-------|-------------|-------|--------|--------|--------|------------|--------|--------|----------|-------------|----------------------------|--------|--------|-------------|--------|----------|---------|--------|--------|---------|--------------|--------|--------|--------|---------|-------|
| * | VEHICLE ENGINE | NOT | * * * | OUTER | | (HD) | 3.83 | 36.48 | 87.08 | 105.29 | 121.31 | 134.47 | 144.90 | 158,27 | | | 181.34 | | | | 185.42 | | | | | | | 104.77 | | | | 185, 19 | 1 |
| * * * * * * * | MAX. LAT. | 0.00 | DATA | | TOROUE | (ft-1b) | 12127 | 11533 | 10549 | 4957 | 2926 | 9168 | 4//8 | 7986 | 2690 | 6311 | 0.000 | 4854 | 4677 | 4000 | 4441 | 4304 | 4265 | 4225 | 4206 | 4166 | 4147 | 4127 | 4108 | 4088 | 4088 | 4068 | |
| PARAMETERS | MAX. FWD. ACCEL. | 0.00 | SPROCKET | INNER SPROCKET | SPEED | (rpm) | 1.58 | 15.75 | 41.00 | 52.41 | 62.79 | 72.47 | 61.46 | 97.37 | 104.29 | 136.28 | 169.48 | 178.99 | 186.08 | 191.61 | 199.79 | 202.16 | 204.40 | 206, 31 | 207.86 | 209,25 | 210,28 | 211.13 | 212.53 | 213.05 | 213.74 | 214.43 | |
| | | , 0 | A SPR | NNI | HORSEPOWER | (Hp) | 3,64 | 34.60 | 82,35 | 99.36 | 114.32 | 126.51 | 100.09 | 148.05 | 152.69 | 163.74 | 165.54 | 165.42 | 165,70 | 165.61 | 160.68 | 165.65 | 165.97 | 165,97 | 166.45 | 165.99 | 166.03 | 164.47 | 166.22 | 165.82 | 166.36 | 166,10 | *** |
| | Y VELOCITY | 13.70 | VEHICLE | daoriacia | | | 0.410 | 0.380 | 0.330 | 0,300 | 0.280 | 0,260 | 0.240 | 0.200 | 0.185 | 0.115 | 0.035 | 0.041 | 0.032 | 0.025 | 0.020 | 0.013 | 0.011 | 6,009 | 0.008 | 900.0 | 0.000 | 0.004 | 0.003 | 0.002 | 0.002 | 0.001 | 60.00 |
| * * * * | INITIAL S VELUCITY (mph) | | > * * * * | TRACTING | EFFORT | (K-165) | | 25.64 | 24.40 | 23,06 | 22.16 | 21.26 | 15.47 | 18,57 | 17.90 | 14.77 | 12.08 | 11.46 | 11.05 | 10.74 | 10.01 | 10.21 | 10,12 | 10.03 | 95.6 | | 000 | 000 | | | 9.72 | 4.67 | |
| | DE RADIUS | | | | DISTANCE | (ft) | 0.08 | 0.54 | 1.05 | 1.59 | 2.22 | 20.01 | 4.60 | 3, 54 | 11.14 | 0 1 × 0 | 33.64 | 42.14 | 50.94 | 59.96 | 78.51 | 87,48 | 47.54 | 107.18 | 116.90 | 1.6.66 | 1 76 4B | 156,20 | 166.11 | 185.99 | 205,92 | 120.41 | 2.00 |
| | E GRADE | | | | VELOCITY | (mph) | 00.1 | 2.60 | 3,33 | 00.00 | 4.60 | 5.17 | 6.18 | 6.62 | B. 65 | 14.41 | 11.36 | 11.81 | 12,16 | 12.44 | 12.80 | 12.98 | 13.10 | 12,20 | 80.0 | | 10.40 | 11.49 | 17.93 | 13,57 | 15.61 | 1 64 | 1.5 |
| | SURFACE | COMPACTED SUIL | | | TIME | (28C) | - i | N P | 0.4 | 0.5 | 9°0 | \ ° 0 | 0 0 | 1.0 | a) : | e e e |) ; -i | ₽ 2 [*] | 0.4 | 0 · 1 | ំ វិសិ | 0.9 | 6.5 J | 7.0 | n : | C E |) c | 0 | 10.0 | 0.11 | |) · · | 0 |

GEAR REDUCTION DYNAMICS

| | | | * * * | MISSION | | FARAMETERS | * * * * | | | |
|-----------|----------------------|----------|-----------------|----------------|------------------|------------------------------|---------------------------------------|------------------|---------|------------------------|
| SEG. NO. | Course | | SURFACE | GRADE (%) | RADIUS (+t) | FORWARD VELOCITY (mph) | MAX. LAT. ACCEL. (g's) | VEHICLE | ENGINE | ELECTRIC DRIVE TYPE |
| ∵ | CHURCHVILLE CO | COURSE | COMPACTED SOIL | 10.7 | 100 | 15.80 | 0.50 | 19.5 TON | VTA-903 | HoFal S-G |
| | | | * * * * | | GEARBOX D | * PATA | *** | | | |
| | OUTER SPROCHET | FROCK ET | ļ. | NN1 | INNER SPROCKET | 1 | ٥ | DIESEL INTERFACE | ACE | |
| | GEAR SFE | SPEED | TORQUE | GEAR | SPEED | TORQUE | GEAR | SPEED | TORQUE | |
| | _ | 4428.4 | 0.644 | GB2-A | 3926.4 | -119.1 | GB1-A | (rpm) 2592.0 | 1009.9 | |
| | 682-8 146 | 1486.1 | 1329.0 | GB2-B | 1308.8 | -357.2 | GB1 - B | 5184.0 | 504.9 | |
| | | 267.5 | 7383.4 | GB2-D | 235.6 | -/14.4 | 2-189 | 11975.0 | 218.6 | |
| | | | * * * | 1881W | ON FAR | MISSION FARAMETERS | * * * * | | | |
| SEG. "ND. | COURSE | | SURFACE | GRADE | RADTUS | FORWARD VELUCITY | MAX. LAT. | VEHICLE | ENGINE | ELECTRIC DRIVE TYPE |
| € 8 | CHURCHVILLE COURSE | JURSE | COMPACTED SOIL | (%) | (ft) 0 | (mph) 19,20 | (a, b) (c) 20 (c) 20 | 19.5 TON | VTA-903 | HoFol S-G |
| E- | | | * * * | GEA | GEARBOX D | DATA ** | * * * | | | |
| 14 | OUTER SPROCKET | PROCKET | | NN | INNER SPROCKET | | 10 | DIESEL INTERFACE | ACE | |
| | GEAR SPE | SPEED | TOROUE | GEAR | SPEED | TORQUE | BEAR | SPEED | TOROUE | |
| | | (rpm) | (ft-1b) | 1 1 1 | (rpm) | (ft-1b) | | (mdu) | (ft-1b) | |
| | | 1698.2 | 499.4 | GB2-8 | 1698.2 | 166.5 | GB1-A | 5197.4 | 1010.0 | |
| | GB2-C 84 GB2-D 30 | 305.7 | 998.8 2774.5 | GB2-C GB2-D | 305.7 | 998.8 | GB1-C | 8.96611 | 218.6 | |
| | | | * * * | MISSION | | FAKAMETERS | * * * * * * * * * * * * * * * * * * * | | | |
| SEG. NO. | COURSE | | SURFACE | GRADE | RADIUS | FORWARD VELOCITY | MAX. LAT. | VEHICLE | ENGINE | ELECTRIC DRIVE TYPE |
| ê n | CHURCHVILLE COURSE | URSE | COMPACTED SOIL | (%) | (ft) 0 | (mph) 45.00 | (¥, 6) | 19.5 TON | VTA-903 | HoPol S-G |
| | | | * * * * | GEA | GEARBOX D | DATA * | * * * * | | | |
| | OUTER SPROCKET | RUCKET | | INNE | INNER SPROCKET | | | DIESEL INTERFACE | | |
| | GEAR SPEED | ED | TORQUE | GEAR | SPEED | rakaue | GEAR | SPEED | TOROUE | |
| | - | | 8.61- | 682-A | 11940.3 | -19.8 | GB1-A | 2596.7 | -11.2 | |
| | GB2-E 398 | 1990, 1 | -118.6 | GB2-8 | 3980.1 1990.0 | 1.00.3 | GB1-18 | 5195.4 | n i | |
| | | V - 17 | 44 | | | | 3-196 | 11770.8 | 4.7- | |

APENDIX F

CONTRACT VEHICLE AND PROPULSION SYSTEM SPECIFICATIONS

ATTACHMENT I

SPECIFICATIONS

1. General Vehicle Specifications (Fig. 2):

Frontal Area 6.34 sq m (68.25 ft²)

Gross Vehicle Weight 36.3 t (n (40 t on)

Vehicle T ap Speed (Governed) 73 Km/hr (+5 mph)

Track Length (forward to aft 4650 mm (183.07 in.) roadwheel centerline)

Distance between track

Distance between track 2790 mm (109.84 in) longitudinal centerline)

Track Width 580 mm (22.83 in.)

2. Propulsion System Specifications:

a. Transmission: (Electric Drive System)

The drive system shall provide automatic speed ration control and inhibitors to prevent engine overspeed. Maximum output torque required shall be sufficient to generate a tractive effort of \$27,000 Newtons, Reverse - \$27,000 Newtons. There shall be tactile feedback to the driver when the transmission is in forward or reverse operational mode. The power train shall provide for safe, predictable performance for extended periods at speeds below 5 Km/hr.

b. Steer System:

A regenerative speed control system is required. Differential torque between sides shall be equal to maximum steer torque. Pivot steer capability on hard surface shall be 7 revolutions/min. The steering controls shall remain operative in the event of engine fallure or vehicle towing. The steer system shall be capable of accepting full engine power.

c Coding Capability:

Capable of continuous tractive effort operation of at least 250,000 N.

d. Braking:

The vehicle shall be capable of a deceleration rate from maximum speed on level hard surface road at least 7 m/sec² (peak) and 5 m/sec² (avg.). The vehicle shall be capable of an included hold with engine off on at least a 60% at ope. The vehicle shall be capable of at least 25 stops from 60 Km/hr @ 5 m/sec² @ 3 minute intervals. The braking functions shall be accomplished by two separate mechanisms to allow redundance for emergency purposes.

ATTACHMENT 1 (Cord)

e. Electric/Hydraulic Power Capability:

Continuous operation of all vehicle electrical and hydraulic systems shall be at least 7 Kw, to include allent watch - the silent watch is non-mobile, with noise, light, and smoke discipline. The above power requirement covers turret hydraulic, raclo and other electrical needs, compartment ventilation and NBC countermeasure equipment. Electrical and hydraulic power sources must be capable of operating independently or in parallel in a stable self regulating manner. Average auxiliary power usage is 3.5 Kw.

1. Speed on Grade:

The propulsion system shall be capable of sustaining forward vehicles speeds on hard surface roads and grades as defined in Figure 1.

g. Acceleration

The vehicle shall be capable of acceleration on dry level surface from idle, from application of the throttle, in the forward direction from zero to 32.2 Km/jr (20 mph) in seven seconds; and in reverse direction from zero to 16 Km/hr (10 mph), in five seconds. Assume no "throttle" linkage delay.

- h. Engine: See figures 4 and 5.
- i. Shock:

The electric drive system must be able to withstand a 15-g shock load in any direction.

ATTACHMENT 2

SPECIFICATIONS

1. General Vehicle Specifications (Fig. 3):

Frontal Area 5.3 sq m (57 ft²)

Gross Vehicle Weight 17.6 ton (19.5 ton)

Vehicle Top Speed (Governed) 73 Km/hr (45 mph)

Track Length (forward to aft roadwheel centerline)

Distance between track 2350 mm (92.52 in)

longitudinal centerline)

Track Width 445 mm (17.52 in)

2. Propulsion System Specifications:

a Transmission (Electric Drive System)

The drive system shall provide automatic speed ration control and inhibitors to prevent engine overspeed. Maximum output torque required shall be sufficient to generate a tractive effort of 208,000 Newtons, Reverse - 208,000 Newtons. There shall be tactile feedback to the driver when the transmission is in forward or reverse operational mode. The power train shall provide for safe, predictable performance for extended periods at speeds below 5 Km/hr.

b. Steer System:

A regenerative speed control system is required. Differential torque between aides shall be equal to maximum steer torque. Pivor steer capability on hard surface shall be 7 revolutions/min. The steering controls shall remain operative in the event of engine failure or vehicle towing. The steer system shall be capable of accepting full engine power.

c. Coding Capability:

Capable of continuous tractive effort operation of at least 121,500 N.

d Braking:

The vehicle shall be capable of a deceleration rate from maximum speed on level hard surface road at least 7 m/sec² (peak) and 5 m/sec² (avg.). The vehicle shall be capable of an included hold with engine off on al least a 60% si ope. The vehicle shall be capable of at least 25 stops from 60 Km/hr @ 5 m/sec² @ 3 minute intervals. The braking functions shall be accomplished by two separate mechanisms to allow redundance for emergency purposes.

ATTACHMENT 2 (Contd)

e. Electric/Hydraulic Power Capability:

Continuous operation of all vehicle electrical and hydraulic systems shall e at least 7 Kw, to include allent watch - the allent watch is non-mobile, with noise, light, and smoke discipline. The above power requirement covers turnet hydraulic, radio and other electrical needs, compartment ventilation and NBC countermeasure equipment. Electrical and hydraulic power sources must be capable of operating independently or in parallel in a stable self regulating manner. Average auxiliary power usage is 2.5 Kw.

1. Speed on Grade:

The propulsion system shall be capable of sustaining forward vehicles speeds on hard surface roads and grades as defined in Figure 1.

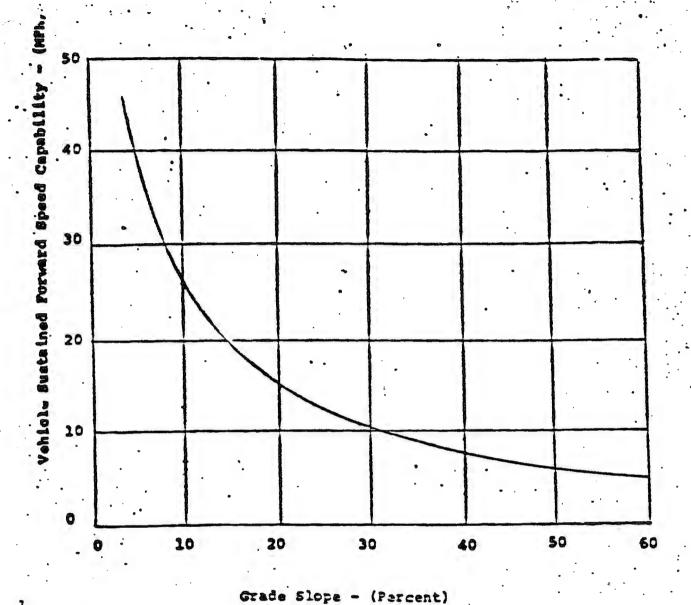
g. Acceleration

The vehicle shall be capable of acceleration on dry level surface from idle, from application of the thrortle, in the forward direction from zero to 32.2 Km/jr (20 mph) in seven seconds; and in reverse direction from zero to 16 Km/hr (10 mph), in five seconds. Assume no "thrortle" linkage delay.

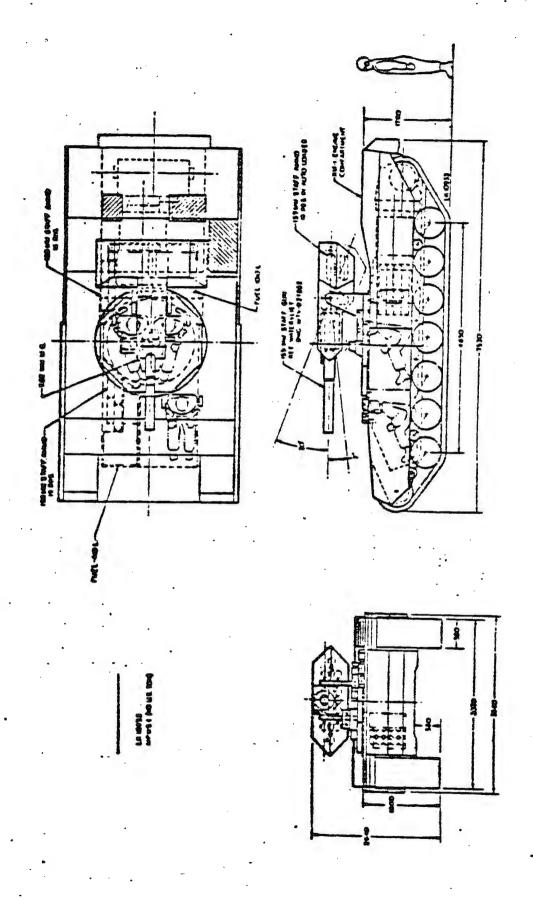
h. Engine: See figures 4 and 5.

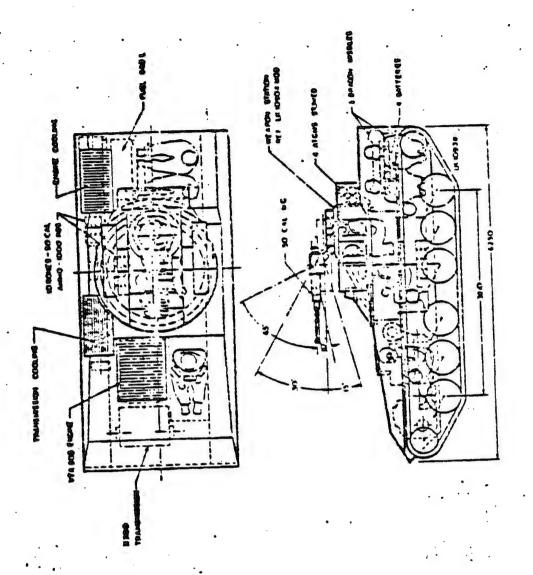
i. Shock:

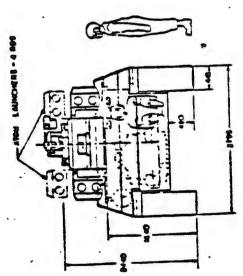
The electric drive system must be able to withstand a 15 g shock load in any direction.

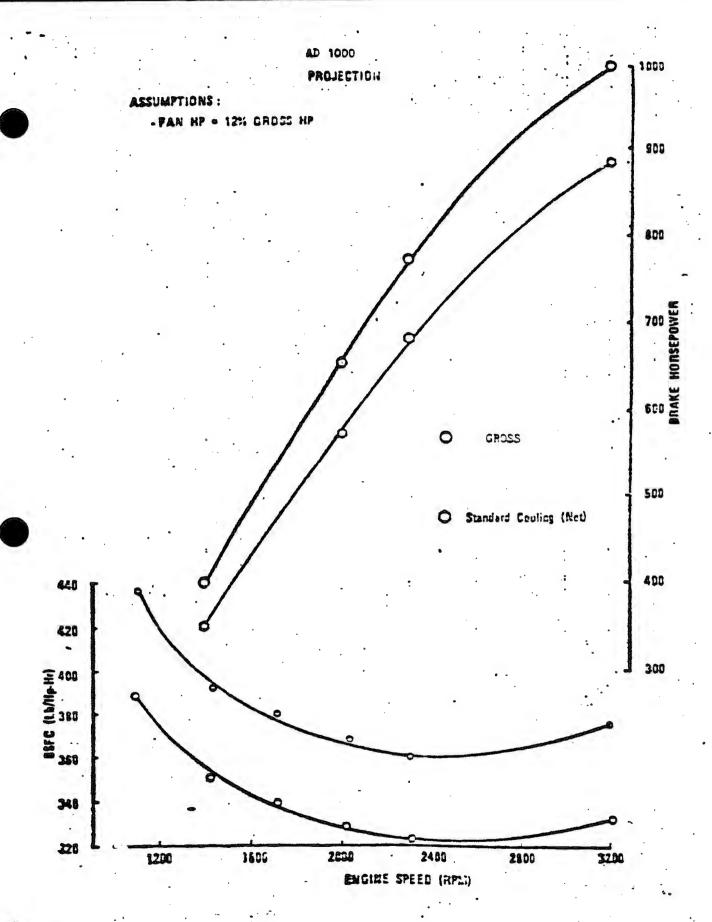


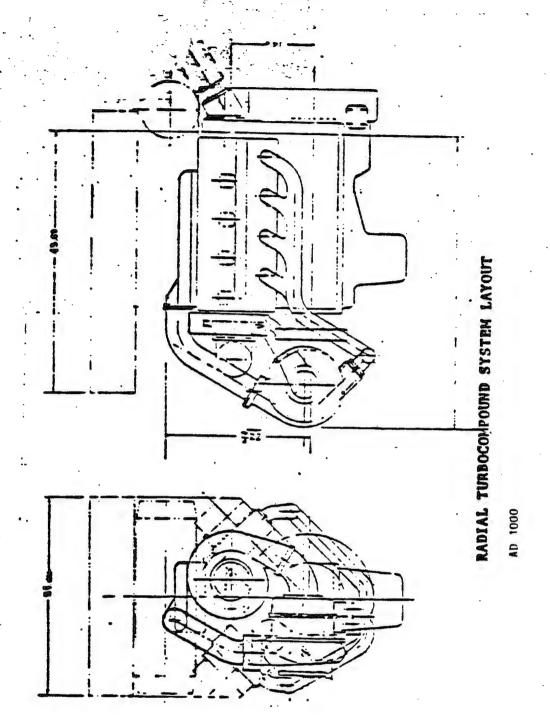
MOTE: Performance shall be measured over hard-surface roads.













CUMMINS ENGINE COMPANY, INC.

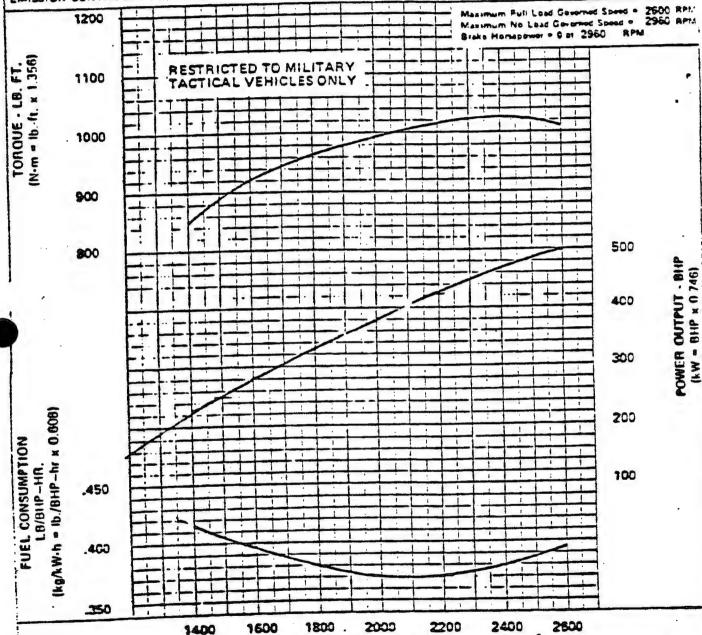
Columbus, Indiana 47201 AUTOMOTIVE PERFORMANCE CURVE

BASIC ENGINE MODEL: CURVE NUMBER: RC-3914-A VTA-903-T DATE: BY: ENGINE FAMILY: CPL CODE: 4/12/79 M.L.S.

0383

RATIF G: ASPIRATION: TURBOCHARGED & AFTERCOOLED in 3 (94.8 Htre) DISPLACEMENT: HE (LW) & RPM STROKE: 4.75 in 1 121 mm) NO. OF CYLINDERS: 8

BORE: 6.5 in (140 mm) 803 (373) @ 2600 PUEL SYSTEM: PT EMISSION CONTROL: AFC



number of SAE standard JB 166 conditions of 200 ft. 1750au granula (21.30" Mg

ENGINE SPEED - RPM

STANDARDS DEPT.

CHIEF ENGINEFR CERTIFIED WITHIN 5%

propulation and atage aleaned (16-ft).

1010 to:11. star, laryr tocque

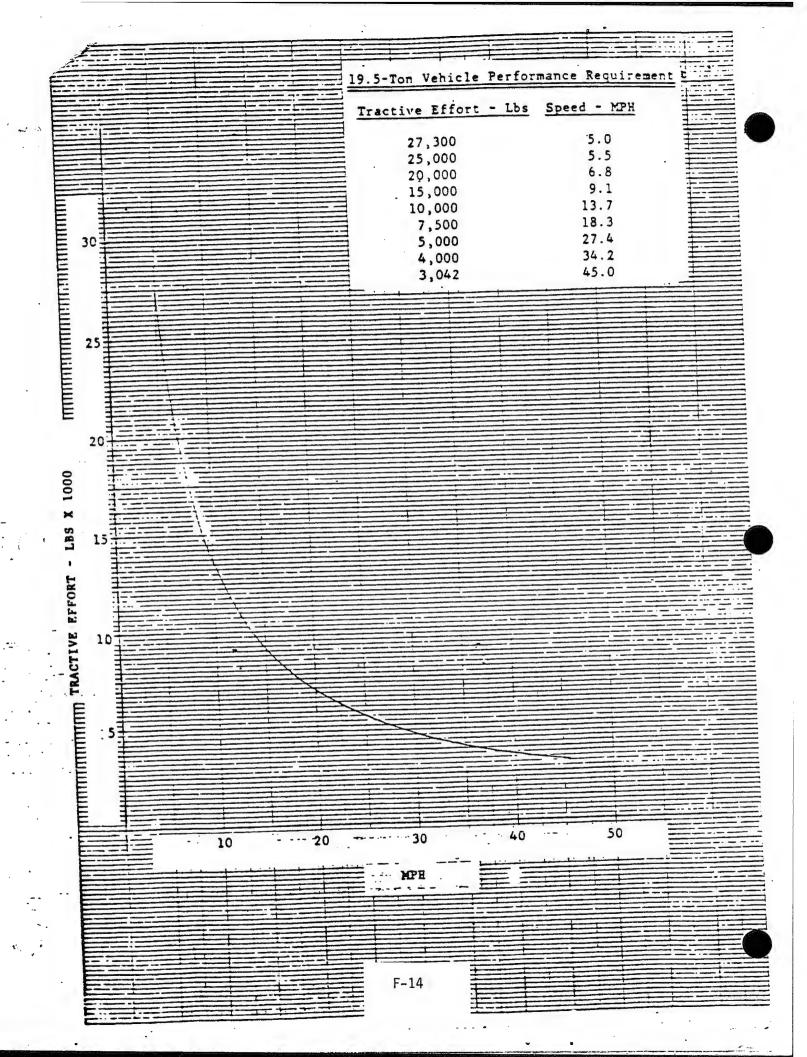
| | | _ | - | _ | _ | _ | _ | | • | _ | • | **** | • : | • | _ | _ | • | • | | _ | - | _ | | _ | | - | _ | _ | | | | _ | _ | • | - | - | - | _ |
|---|-------|--------|-------|-------|-------|-------|-------|------|--------|-------|------|----------|-------|--------|--------|-------|-------|------|-------|-------|------------|----------|------------|-------|-----|-----------|------------|----------|----------|--------|------------|------|-------|----------|-------|-------|------|-------|
| 24 P P P P P P P P P P P P P P P P P P P | | 95 76 | 250 | 3111 | 2670 | 1900 | 9539 | 1617 | . 7764 | .0555 | .047 | -675 | 280% | . 4236 | 0 | • | 0 | • | e | • | 0 | . | D (| 2 6 | • • | • | • | • | • | • | D (| | • | • | • | • | > < | • |
| Pe Cassiffs, Cl Rad | | - 1666 | 8.9 | .1132 | .7619 | 3 | 9099 | 22 | . 100 | 20. | 9.6 | Z | 3 | 3639 | | 6 | 3 | | | | 0 (| • | • | | • | • | • | • | 9 (| 0 1 | | | | • | | • 6 | | • |
| or see an | | -1425 | === | 1291 | 9061- | 5002 | .111 | 7417 | 2992 | 6662 | 502 | 4114 | 1141 | ~ | • | • | • | • | 0 (| | > < | | | 3 | 908 | 3 | 776 | 5 | 1: | 100 | 3 | 3 | | | 5 | | 9 | 2 |
| PROPULSION STOROSIATIC STICK | | 200 | 100 | -2437 | -2437 | -2637 | .2017 | 7437 | 1437 | 2632 | 2169 | 1000 | = | 2.2 | 2 | | = | | | | | | - | 200 | \$ | 200 | 20 | 2 | 1 | 3 | 3 | | 2 | 5 | - | Z | 273 | 2 |
| PROPASIGN STONOTATIC | i | 200 | | | * | 2 | 3 | • | - 619 | - X | 202 | 207 | -1076 | 22 | 8/1 | 411 | | 200 | | 2 | . <u> </u> | 747 | 3 | 510 | 5 | 266 | 0.5 | | | 211 | 2 | 32 - | . 335 | * X.46 | 211 | . 475 | = . | 3 |
| ST NOW I'M | | | | • | | • | | 0 | • | 0 | | S | • | - ; | - | | 3676 | 7417 | 27.10 | 265 | - | 3 | .1472 | • | • | • | D 6 | • | | • | • | • | 0 | D | • | • | • | • |
| F 52. | 8 | | | | | 2 | 1 | | 5 | 2 : | | | | | | | - | | 137 | 137 | | 7.17 | 111 | 212 | - | . 1 | | | = | = | \$ | 3 | = | 9 | = | 8 | 3 | ž: |
| Bliam? la | you. | | | 31 | | 2: | | 9 5 | | 2000 | 200 | 200 | 2076 | 700 | 76.94 | 2.704 | -2026 | .707 | *** | - mis | 9702- | -20% | | 2.0 | S i | | ?= | 3 | = = | - == - | 2 | 3 | | 2 | = | | 25 | - 20 |
| Pro man | 96/1- | 11767 | 0/01 | 7 | 916 | | | 3 | | 1 | 1286 | 982 | 1700 | 1280 | . 17Re | -1704 | 1709 | 1200 | -1709 | -1209 | 1788 | - | 1021 | 2 : | 97. | | 100 | 2 | 9 | ~ | 2 | 5 | È | | | - | | - 1/4 |
| 18 F. P. P. P. P. P. P. P. P. P. P. P. P. P. | 900 | 1303 | 1000 | 9,6 | 6.50 | | • | ž | 9/6 | 300 | 100 | 200 | 100 | 908 | 900 | 300 | 100 | 200 | 8 | 2 | 200 | 9 3 | Ξ: | | | 77. | 8 | 0 | <u>-</u> | ~ ; | 22 | | | | 600 | 436 | | 3 |
| MVIL OFF | 200 | 1:31 | 1002 | 074 | | - | 9 | Ē | 674 | 100 | 100 | 200 | 300 | 304 | 2 | 100 | 200 | NA - | * | 2 | 2 | | | | 200 | <u>\$</u> | 904 | 106 | - K. | 23 | | 2 | 300 | 3 | 100 | 100 | 7.4 | |
| Mri Gis | 100 | 1281 | 1001- | • 034 | 129 . | | • | 2 | . 979 | - | -1×6 | 3 | 100 | ÷ | 3. | - M | 901 | - X | - | 3 | | | | 107 | 904 | - M | * | | | | * | | - | 100 | - | 20 | 202 | |
| 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 1310 | 3 | 22 | 9 | 2 | = | • | 5 | 101 | 1510 | 1510 | 1510 | 031 | 200 | 01:1 | - 2:0 | 25.0 | 015 | | | | - | | 0161 | 011 | 1510 | 200 | A | | | 25.0 | 2.0 | 15:0 | 3.6 | 210 | 1510 | 15.5 | |
| NATE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TO THE PERSON NAMED IN | 949 | 8 | 8 | 8 | 82. | 8 | • | 3 | 200 | 2 | 5 | 8 | 99 | 8 | 00 | 3 | 0 | 8 9 | 38 | 200 | 5 | 9 | 1,00 | 11.00 | 900 | 25 | 2 | 3 | 3 5 | 2 2 | 6097 | 0016 | 2 | 200 | 20.00 | 200 | 1700 | |

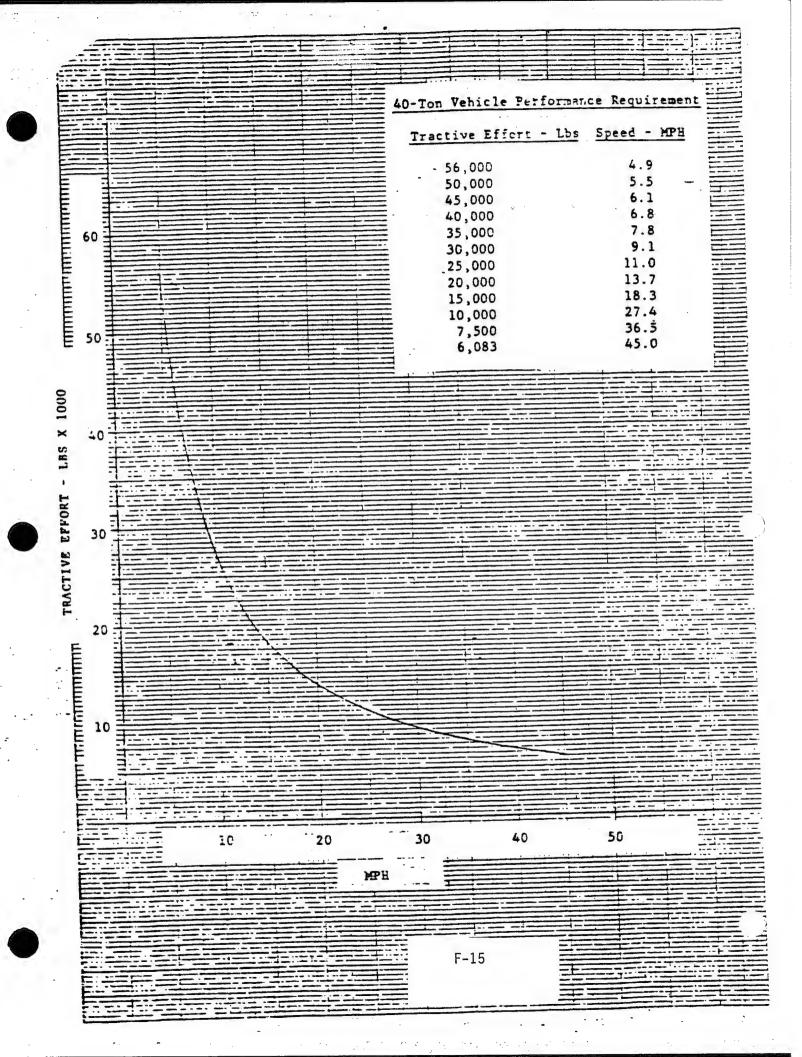
Bure 8

Figure 7

SPURE BELAN 25.000 25 -197 WALL UM 10064 - 10064 - 10066 CAIVEN CE 460. IL 100 to 10 CUIPUL PLANKIAM FILE IT SPUR GEAR. 1045 5 10 SPUR CEAR Per sta. 25 S71, SPUB CL/B. South Scha. 191 - 23 FI AIN. GLAR 11 CAROTTO STEUT PURATAPY SPR LIM. 5 P1 91 93 \$100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

propoleton and eteer eyeson element granemication input speed.





This Page Intentionally Left Blank

APENDIX G

HOMOPOLAR MACHINE DESCRIPTION

APPENDIX 6 Homopolar Machine Description

One of the vehicle drive system concepts selected utilizes homopolar (single pole) machines as the propulsive component. These direct current (DC) machines are characterized by the low voltage (\angle 50V) and high current nature of their output and the simplicity which is inherent in their design.

G.1 Homopolar Machine Operation

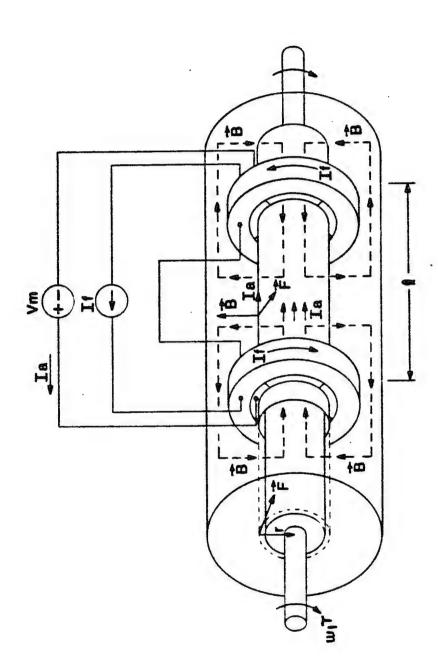
G.1.1 Voltage Generation

Operation of the homopolar machine is governed by Faraday's Law, which relates the mechanical machine parameters, rotational velocity, and magnetic flux to the voltage produced across the rotor (armature). Specifically, V & Bwr & where;

- V = the voltage generated across the armature
- B = the density of the magnetic flux passing through the rotor
- w =the rotational velocity of the rotor
- r = the radius of the rotor drum
- 1 = the active machine length (defined as the length of the rotor across which the magnetic flux passes)

The manner in which this relation is satisfied by the machine is shown in Figure 6.1.1-1. A solid rotor drum, made of iron or other low magnetic reluctance material, is captured within a thin conducting sleeve which is electrically insulated from the rotor. Electrical connections are made around the periphery at each end of the sleeve by a series of sliding brush contacts. coils, which are wound in opposite directions from one another in a circumferential manner, are placed around the rotor near each The entire structure is encased within a housing of magnetic material to provide a low reluctance return path for the During operation as a generator (the homopolar magnetic flux. machine acts equally well in a motoring mode) the field coils are excited with a DC current If, giving rise to a toroidally oriented magnetic flux about each of the coils. The net flux density which passes across the active length of the rotor ($m{m{L}}$) is the combined field from each of the field coils. As the rotor is turned at a rotational speed w, the lines of magnetic flux B are constantly cut by the active length $oldsymbol{\mathcal{L}}$, generating a differential voltage across the rotor drum which satisfies Faraday's Law. This voltage is available at the two brush rings, and if connected to a load, will result in the flow of armature current æ

BASIC HOMOPOLAR MACHINE OPERATION



Defining Equations: dデー(Ladi x B) x た, [「下ー Lali Bi 正]

G.1.2 Torque Generation

The generation of torque by the homopolar machine is governed by the vector relation $\mathcal{F} = Ia \ (\mathbf{I} \times \mathbf{B}) \times \mathbf{F}$ and is best understood through consideration of the machine in a motoring mode. With the field coils excited and a potential Vm applied across the armature, an armature current Ia flows proportional to whatever resistance is encountered in the armature circuit. The interaction of the two orthogonal vectors in the directions of the magnetic flux and the armature current give rise to a generated force tangential to the rotor drum. The vector cross product of this force with the radius vector of the machine results in a generated torque about the axis of the rotor. This torque is then transmitted along the shaft.

6.2 Homopolar Machine Characteristics

G.2.1 Machine Losses

Homopolar electrical losses are a function of three components; field coil resistance, armature sleeve resistance, and brush contact potential drop and resistance. Of these, the brush losses are the most significant contributor, due to resistance vs wear tradeoff which must be analyszed when the brush materai is selected. For example, a greater brush force will accelerate brush wear, but will result in a lower resistance and less heating. Lower heat dissipation then helps to lengthen brush life. Active brush cooling helps to reduce some of these factors significantly. Mechanical losses are those normally associated with rotary machinery; i.e., friction and windage. These losses are most prevalent in the machine, and account for the majority of the total losses, particularly if there is little electrical load.

6.2.2 Speed/Torque Characteristics

Electrical machines are characterized by the speed vs torque profile which defines the operatng limits at any particular load. A representative curve for a homopolar machine is given in Figure 6.2.2-1. The primary machine limitation is thermal rather than magnetic saturation or reaction torque demagnetization (as with permanent magnet DC motors). As long as adequate heat removal is provided, the homopolar machine can deliver rated torque over the full speed range of the machine. Higher, noncontinuous torques at stall or very low speeds are also attainable and can be maintained with sufficient cooling. Stall torque levels are ultimately limited by brush current density, which coupled with the rotor tip speed, for an envelope which defines the maximum transient load.

6.2.3 Homopolar Gain/Control

A primary advantage of homopolar machines is the ability to control their operation through excitation of the field windings

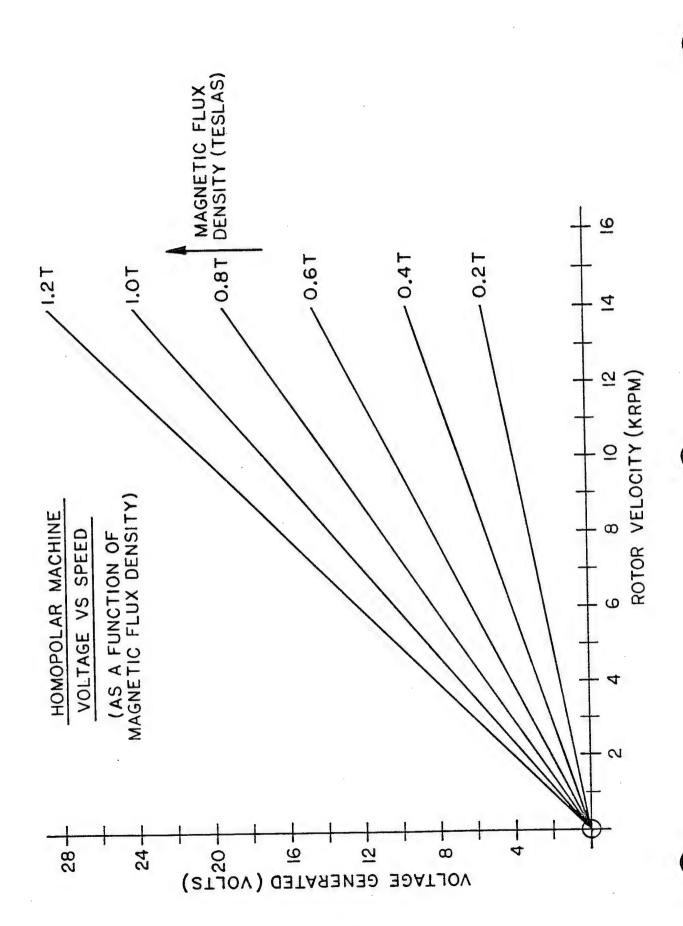
at a much reduced power level. This is in contrast to all AC drive systems which require that a series controller capable of handling the entire motor power be used to generate the necessary AC waveforms. Homopolar machine gain is defined as the ratio of the output power (mechanical for the motoring mode, electrical for the generating mode) to the full excitation power of the field coils. Present homopolar designs yield gains on the order The method of control is best demonstrated by Figure G.2.3-1. Which presents a family of linear speed vs voltage Due to the simplicity of construction and single pole nature of the machine, generated armature voltage is a linear function of rotational velocity. The magnitude of the voltage is controlled by the level of magnetic flux in the machine. the flux level is directly proportional to the field current provided, a control parameter for machine speed is realized. In a similar manner, as shown in Figure 6.2.3-2, the armature torque generated is a linear function of the armature current and the Hence torque control is also realized through this level. same control parameter. In a system which incorporates a homopolar motor and a generator, both speed and torque control are available to the user.

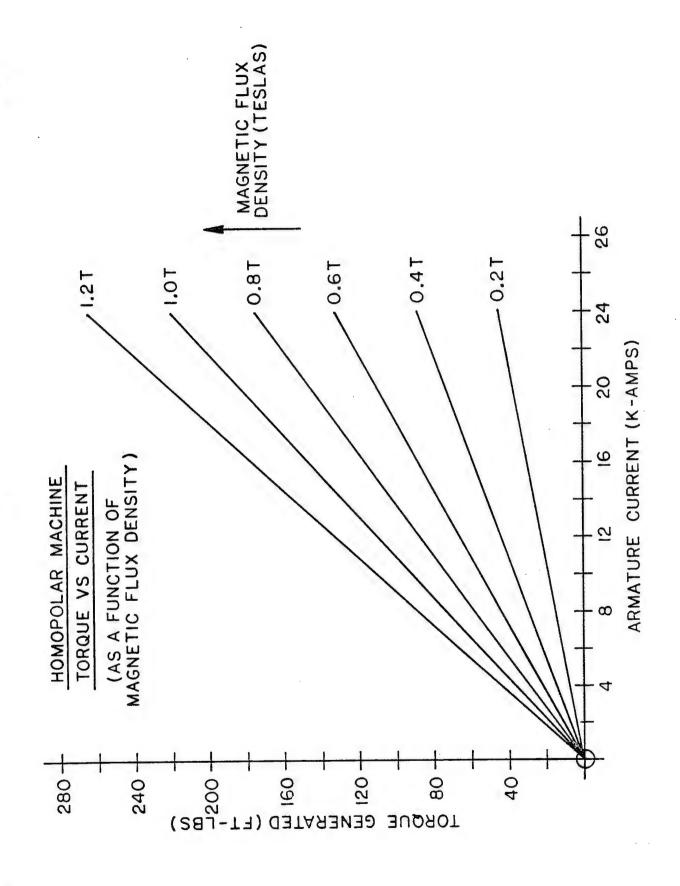
G.2.4 Power Density

Power densities of homopolar machines are moderate in comparison with those of competing technologies. Although significantly better than those of conventinal DC machines or industrial induction motors, homopolar power densities are not as great as those of machines excited by high frequency AC (i.e., high frequency synchronous or hybrid, brushless machines). This is due in part to the low induction level of materials available and thus the amount of magnetic material required to carry the It should be realized, however, that if necessary flux levels. the weight and volume requirements of the series controller required by each of the AC systems is incorporated into an overall system weight for each of the alternate technology macines, a more equitable comparison is achieved. In such a the power density of the homopolar system is comparison competitive.

G.2.5 Thermal Requirements

The homopolar machnes recommended for use as vehicle propulsive elements require liquid cooling for proper operation under normal vehicle loads. This is also true for other high performance technologies (i.e., high frequency AC driven machines). Internal cooling of the homopolar machine rotor drum and brush assemblies are flood cooled, and coolant is circulated through each of the field coils. There is no requirement regarding the ion content of the coolant due to the low potentials which exist within the machine. Precautions, however, should be taken to maintain coolant cleanliness consistent with that required by machines of similar precision.





G.2.6. Rotor Inertia

Rotor inertia of drum configured homopolar machines are competitive will all alternate technology machines and in many cases, such as with large diameter brushless motors (LSHT), are significantly better. Rotor magnetic material mass is the primary influence on this parameter due to the requirement of a complete flux circuit path. Several innovative inertia reduction techniques have been proposed which could ultimately reduce homopolar inertias to less that 25 percent of present designs, resulting in extremely responsive high power machines with servodrive applications.

APPENDIX H

AC MACHINES OPERATION

H.1 General

In this section, induction, synchronous, and permanent magnet machines are briefly described in terms of their operation.

H.2 <u>Induction Motors</u>. Induction motors are probably the most universal of all motors in present use. They are characterized by extreme simplicity, very rugged construction, high reliability, and low manufacturing cost. AC induction motors can be designed to operate over wide frequency extremes and are very tolerant to waveshape (although reasonable sine waves are preferable), and applied voltage variations. They can be easily designed for single, two, or three or more phased operations. While single-phased motors are not easily reversible, three-phased designs can be reversed electrically.

Operation of induction motors is best described by transformer theory. For simple example purposes, the stator winding can be considered as the primary winding and the rotor the secondary winding. However, the rotor winding is essentially a number of parallel, shorted turns. Thus, voltage so induced across the airgap causes a voltage and appropriate current to circulate in the rotor windings. This rotor current produces a reactive force which opposes the stator current, producing rotation of the armature which is attached to the output shaft. The motor/transformer analogy, however, is no longer valid when the airgap is considered. In a well-designed multiphase power transformer, the airgap is made as small as possible to minimize the loss in power conversion from the primary to secondary winding. In the induction motor, the airgap must provide a correct balance of induced flux in the rotor and airgap loss. Due to the series relationship of the motor windings and the airgap. and the low resistance of the rotor windings, large currents flow in the rotor conductors when small voltages are present at the rotor windings. This action directly depends on the voltage and current relationships resulting from application of the turns ratio of the stator and rotor windings.

The motor "series" airgap thus balances the excess voltage flux wave not required by the rotor to maintain the rotating speed. In the transformer analogy, this would be equivalent to a high leakage reactance design with a mechanical separation between primary and secondary windings. In this specific case, the leakage reactance balances the excess flux when the secondary winding is shortcircuited.

So far, the discussion has established the theory of rotation for the armature. For the armature to actually rotate, the airgap flux wave must also rotate, either continuously, as in a three-phase AC system, or instantaneously, as in a single-phase AC system. For single-phase systems, a capacitor or separate start-winding is required to shift the phase of the airgap flux wave to start rotation. However, for electric vehicle use, we will consider only the three-phase power system since the three-phase AC system has a naturally occurring flux field rotation.

The transformer analogy of induction motors can also be extended to the relative size of the motor. The well known transformer equation relating flux density, applied voltage, core area, and frequency (a specific application of Faraday's law) applies directly to AC induction motors. Thus, for low frequency AC systems, the area and volume of stator and rotor iron required to support the applied voltage will be greater than for higher frequencies. Coupled with the naturally rotating flux wave of three-phase systems, this sets the physical dimensions of the motor. It also allows for a convenient control of motor speed by varying the applied frequency, since changing the frequency results in a change in the rotating flux field in the airgap. Generally, industrial induction motors can be operated over a minimum of 2/1 speed range with some operation of up to 4/1.

Electric vehicle application experience using AC induction motors has been favorable. Extensive design and testing of induction motor powered vehicles took place in the early 1970's. The test results were generally satisfactory—the major problem being the reliability of the variable frequency inverter. The development effort did, however, establish desirable characteristics for the induction motor (mainly reduced size and weight, and improved efficiency) for electric vehicle use.

H.3 Synchronous Motors. In the discussion dealing with induction motors, it was established that the rotor reactive force is developed by induced voltage and the resultant current is transformed from the stator winding. As the reactive force creates armature rotation, the actual armature positional relationship with respect to the induced rotor flux will be slightly retarded. As the motor approaches full speed, the positional relationship becomes relatively constant, and thus rotates at a speed equal to 3 to 10 percent of the applied frequency base speed. This difference in rotor speed as a ratio of base speed is defined as the slip speed.

A special case can be made for AC induction motor designs in which the slip ratio is held at unity. Under this circumstance the rotor speed and the field flux rotational speed are equal. Motors of this type thus have a synchronous speed relationship, and bear this name. Synchronous motors are characterized by having wound rotors which can be separately excited from an external voltage source, rather than excited through induction from the stator winding. This capability allows for establishing a high reactive force in the armature, even at zero rotor speed. It holds that the stator induced field flux and the rotor reactive force developed from separate power can be individually controlled. Since the rotor reactive force determines the motor torque and the stator frequncy controls the motor speed, the synchronous motor has the inherent characteristics desirable for electric vehicle applications. An additional control characteristic is available in synchronous motors because of slip frequency. Since by definition, synchronous operation requires that the slip frequency be unity, a change in slip frequency requires a corresponding in rotor speed to maintain the motor magnetic circuit in balance. In synchronous motors, the slip ratio can be controlled by a change in the rotor

excitation. Thus for electric vehicle applications, either the stator frequency or rotor excitation may be changed to command acceleration or deceleration, as required.

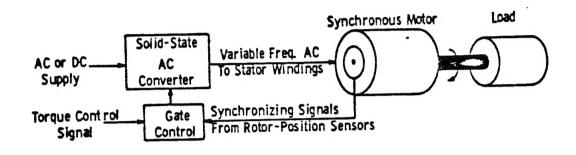
Recent developments in synchronous motors and generators have eliminated the requirement for direct excitation connections to the rotor windings. Figure H.3-1 illustrates the system for controlling the rotor excitation by additional components attached to the common output shaft. The key feature of this system is the integral AC exciter/alternator and rotating rectifiers. This system can produce the required rotor excitation very efficiently due to the transformation action of the alternator. System controlability is excellent due to the high gain available in the control loop. Due to the transformation characteristics of the AC exciter, small, low-power error signals can command the motor/generator system over the full-rated power range. Response times are very short and thus the system is very reactive to operator inputs. This command/control characteristic is desirable in electric vehicle drive systems to maintain both responsiveness and stability.

H.4 Permanent Magnet Brushless DC Motors. During the mid-1950's, development of high energy magnet materials allowed designers to employ these permanent magnets in motor structures as the source of rotor excitation. As permanent magnet materials have improved, designers have applied them to larger motors which at present range up to 50-100 Horsepower. Early development of the permanent magnet motor was characterized by simply substituting the magnet for a wound-field structure in shunt-wound DC motors. The motor thus performed in a similar fashion to the conventional, DC mechanically-commutated motor, except that motor speed increased linearly with applied voltage. This characteristic is due to the fixed, constant-level of field flux generated by the permanent magnets.

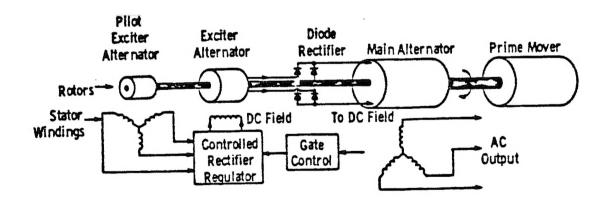
While the speed versus applied voltage linearity was recognized as a desirable characteristic, the speed versus torque curve reacts in an opposite manner. Thus, while speed increases with voltage, torque decreases with speed in a reasonably linear fashion. These features of the permanent magnet motor, while usable in many applications—including small electric vehicle drives, would not be successful in large electric vehicle drives where extreme performance is the requirement.

Within the past ten years, development efforts in permanent magnet motors have produced a true hybrid motor. These hybrid motors have many of the desirable characteristics of DC motors (such as speed versus voltage linearity) while being controlled and commutated from an AC source. This family is generally labeled "Brushless" DC motors.

Brushless DC motors are characterized by their construction which is similar to a conventional multiphase AC motor, except the usual peripheral field permanent magnets are replaced by a multiphase (usually three) winding powered by an electronic inverter. The inverter is operated at selected frequencies which are dependent on motor design and provide the electronic commutation function. The permanent magnets are attached to the rotor in a manner which



(a) High Frequency AC Synchronous Motor Drive



(b) High Frequency AC Synchronous Alternator

Figure H.3-1. Diagrammatic Representation of Brushless Excitation System

provides for field flux in the stator/rotor airgap. This design allows for considerable flexibility in the rotor design and the number of poles available for reacting with the rotor. These design variables result in two basic brushless motor designs: one having small rotor diameters, few poles, and a magnet length dependent upon the horsepower requirement; and one having large rotor diameters many poles and, relatively short magnet length. Generally these two motor types are classified as High Speed/Low Torque (HSLT), and Low Speed/High Torque (LSHT) designs.

Excellent thermal characteristics is one of the major features of the brushless motor design. With the heat-generating windings situated on the stator, low thermal resistance in the stator iron allows for relatively unimpeded heat flow to the outside motor shell. Appropriate cooling can be employed to removed this heat and maintain the motor at rated temperature. Very little heat is generated by the permanent magnet rotor structure and, consequently, the rotor temperature rise is minimized.

General reliability of brushless motors is very favorable. Care must be used in selecting the motor type, however, so that vibration and shock do not cause damage to the magnet structures. Although minor cracking of the magnets will not cause a major motor failure, cracks can cause degradation in motor performance. A more significant failure can result if the magnets fragment and produce chips which can lodge in the airgap.

Brushless DC motors offer desirable features to electric vehicle drives. The control characteristics, when considered with the capabilities of electronic commutation controllers, offer the potential for independent speed and torque control. Motor efficiency is high and the construction provides excellent thermal dissipation. Further, as defined by the vehicle specifications, the brushless motor may be designed for high- or low-speed operation with the appropriate resultant torques.

DISTRIBUTION LIST

| | Copie | S |
|---|---------------------|---|
| Commander Defense Technical Information Center Building 5, Cameron Station ATTN: DDAC Alexandria, VA 22304-9990 | 12 | |
| Manager Defense Logistics Studies Information Exchange ATTN: AMXMC-D Fort Lee, VA 23801-6044 | 2 | |
| Commander U.S. Army Tank-Automotive Command ATTN: AMSTA-DDL Warren MI 48397-5000 | 2 | |
| Commander U.S. Army Tank-Automotive Command ATTN: AMSTA-CF (Mr. G. Orlicki) Warren MI 48397-5000 | 1 | |
| Commander U.S. Assert Tank Automotive Command | 14 | , |
| U.S. Army Tank-Automotive Command ATTN: AMSTA-RGT Warren MI 48397-5000 | and 20 (Vol 1 on | |

This page intentionally left blank.